Monotype
Material Making Machine

Operating and Adjustment Manual

Lanston Monotype Company

Division of Lanston Industries, Inc. • 24th and Locust Streets, Philadelphia 1, Pa.

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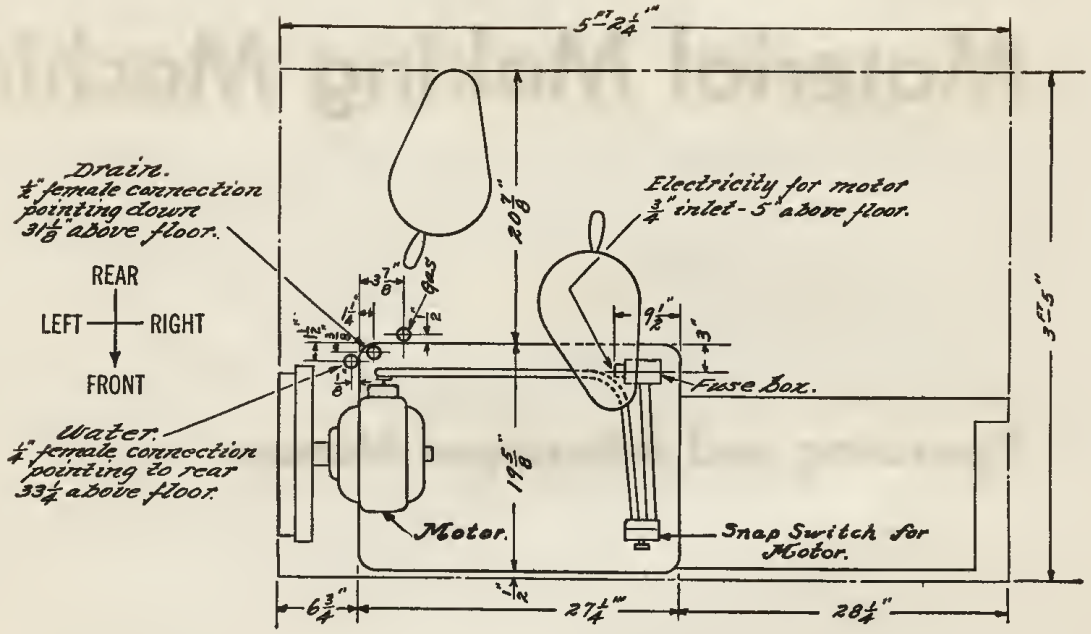

FLOOR PLAN

Revised Edition

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THE MONOTYPE MATERIAL MAKING MACHINE

As its name indicates, the Monotype Material Making Machine casts all material used for make-up. Its products include leads, slugs, rules, column rules, decorative borders, tie-up slugs, and electrotype bearers, all either in strips or cut to labor-saving measures, and single column leads, slugs, rules, logotypes and cut-off dashes - in fact, any and all continuous strip material in any desired length, and non-fused material in single casts up to 15 picas long.

The parts or units of the Monotype Material Making Machine are:

Mold Holder	through which water circulates for cooling the product, and in which there is a
Mold Closure	that alternately opens and closes the opening through which molten metal is injected into the Mold;
Mold	in which the body of the product is cast;
Matrix	from which the face of the product is cast;
Bridge Mechanism	for raising and lowering the Matrix;
Mold Blade Operation Mechanism and Micrometer Wedges	for location and length of stroke;
Gear Shift and Two-Step Pulley	for change of speed;
Melting Pot and Pump Mechanism	for melting metal and injecting the molten metal into the Mold;
Automatic Cutter	for cutting and stacking continuous strip material;
Stacker	for automatically stacking column-width, non-fused material;
Cams, Levers, Bell Cranks, etc.	for transmitting power and motion from the driving motor to the various operating parts of the machine.

The Mold Holder (Fig. 23) remains permanently on the machine and in it is clamped the required Mold Unit for the product to be cast. The water for cooling the Mold circulates through each of the two main Blocks (Bolsters) of the Mold Holder, but does not pass from one Block to the other; there is, therefore, no possible chance of water entering the Mold. The Mold is located in the Mold Holder by its Point Blocks positioned against the two Gage Plates. The two Matrix Guides position the Matrix on the Mold for correct location of the rule or border to be cast. The rear Matrix Guide is positioned against the Point Blocks of the Mold and the front Matrix Guide positioned by using the Mold Blade Gage (Fig. 29).

In the base of the Mold Holder is the Mold Closure, a slide that alternately opens and closes the opening through which the molten metal is forced into the Mold. The Mold Closure opens in time for the Pump stroke and closes when the Pump is completing its stroke, thus insuring a full solid cast in the Mold. The distance the Mold Closure opens and the position of this opening can be regulated to suit the material being cast. The Mold Closure closes against the Stop Plate which in turn is positioned by a Graduated Wedge between it and its Abutment. The Abutment can be turned to either of two positions, depending on the point size of the Mold, as explained later.

The Mold Unit (Fig. 23) forms the cavity in which the product is cast. It consists of two Type Blocks with two Point Blocks (one at either end) to separate the Type Blocks, and a Mold Blade that operates between the Type Blocks and beneath the left Point Block. The Type Blocks and Point Blocks are fastened together by screws, but the Mold Blade is loose and special care must be taken not to drop it.

The Type Blocks have an opening in the middle of their upper side (between the Point Blocks) in which the matrix in its Carrier is placed. To produce type-high material a Matrix with a face driven in it is used, while for low material a Blank Matrix is used. Molds for casting low material (leads or slugs) of any height from .743" to .876" can be furnished, but, in general, only those for casting leads or slugs .888" or .853" high (.030" or .065" below type-high) can be used for casting the standard type-high material. There are some exceptions to this, such as special Molds .903" high, used with .015" drive Matrix for casting classified ad rules. Only one point size and height of leads or slugs can be cast from a given Mold.

The range of point sizes is from 1 point to 18 point for leads and slugs, from 1 1/2 point to 18 point for strip rules, and from 2 point to 18 point for decorative border.

Molds from 4 point to 12 point inclusive, produce either fusion or non-fusion from the same Mold. The 1 point Mold is made for fusion only. In 1 1/2, 2 and 3 point sizes a different Mold is required for fusion from that used for

non-fusion. The 1 1/2, 2 and 3 point non-fusion Molds and all larger point size Molds are symbolled NR, the 1, 1 1/2, 2, and 3 point Molds for fusion are symbolled NR2F. Modifications of the Standard Molds, such as Tie-up Slug Molds (NRA), Flush Side Molds (NRB), Molds equipped with trimmers (NR2G), and Molds with trimmers for casting from slug machine matrices (NRG), can be furnished.

The Matrix (Fig. 29) closes the top of the Mold opening. It is carried by the Bridge Mechanism (Fig. 21) and may be held permanently in contact with the Mold for leads, slugs and straight-line rules or raised and lowered at each stroke for other material such as decorative borders and cut-off dashes.

For casting low material, such as leads and slugs, a Blank Matrix is used, while for face material a Driven Matrix is required. There are four general styles of Matrices for face material: (1) for continuous strip rules and decorative borders; (2) for a non-fusion column-width product on which the face is shorter than the body, such as cut-off dashes; (3) for a non-fusion column-width product on which the face is cast the same length as the body; (4) for flush-to-side material requiring also a special Flush-Side Mold.

Matrices are made and symbolled for the smallest point size body on which they can be cast, but the same Matrix can be used on any larger point size body and the face will be the same distance from the side of the body as it is on the smaller point size. That is, a face near the side of the body on a 2 point Matrix can be used for casting the same face the same distance from the side of the body on 6 or 12 point body or any body size larger than 2 point. Matrices for flush-side material are an exception to the above, because they can be used only on a Mold of the same point size as the Matrix.

The Bridge Mechanism (Fig. 21) consists of a tripod with a Toggle Link from which is suspended the Matrix. The Toggle Link is operated by a Cam Lever acting through a Spring and, at the will of the operator, raises and lowers the Matrix at each stroke or hold it permanently on the Mold under spring pressure.

The Micrometer Wedges (Fig. 17) are used to obtain the exact desired length of stroke of the Mold Blade. They act as an abutment for the Mold Blade Operating Bar at each end of its stroke. When changing stroke it is necessary to get the approximate length of stroke as shown by the movement of the zero reference line on Operating Rod 2 in relation to Scale 3 (Fig. 22), before making the fine adjustment with the Micrometer Wedges. The Bell Crank (Fig. 18) operating the Mold Blade Operating Bar, has holes in its rear arm for obtaining varying lengths of non-fusion as well as fusion material. The Stud connecting the Bell Crank with the Spring Box from the Cam Lever is to be placed in the hole of the Bell Crank corresponding to the desired length of stroke of product. Then the exact length of stroke is obtained by the Micrometer Wedges (Fig. 17).

Change of speed is obtained by a four-position Gear Shift on the machine and a Two-Step Pulley on the Motor. The Gear Shift gives four speeds for each step of the motor pulley or a total of eight speeds for the machine. These speeds give a wide range so that the maximum production can be obtained from each size and style of material.

The Melting Pot (Fig. 2) and Pump Body (Fig. 10) supply molten metal which is forced into the Mold at each revolution of the machine when the Pump Control Handle 38 (Fig. 5) at the front of the machine is up. When this Handle is thrown down by a touch of the operator, casting will immediately stop.

The Automatic Cutter (Figs. 11 to 16) will cut continuous strip material in any length up to 25". It will also stack all lengths from 25" down to about 11 picas. Shorter measures can be cut and stacked by substituting the wide Pawl Finger 7 (Fig. 11) and applying the Shear Blade Guide Stop 8. These parts are furnished as standard equipment. Refer to instructions for use of these parts under the heading "Short Lengths," page 34.

The Non-fusion Stacker (Fig. 16) handles all non-fused product, column-width and narrower, stacking it in a special Channel toward the front of the machine. It is provided with a Shear Blade for doing the stacking so that if there is slight fusion or imperfect delivery, as in trial setting of the Stacker, the product will be sheared and delivered into the Stacker without injury to the parts. The Stacker is put into operation by the shift of a Lever and to change back to continuous strip it is necessary only to shift this Lever, remove the Stacker Bar and the Stacker.

The Cams through which power is transmitted to the various parts of the machine, run in oil and require no attention other than keeping sufficient oil in the Case and cleaning it out about once a year or oftener if it is found to require it. Filter the oil and return it to the Case with enough more to bring the level up so it can just be seen in the sight feed Elbow on the front of the Case. Do not fill to the top of the Elbow or oil will wave over when the machine is run.

The electrical equipment furnished consists of a four-pole Toggle Switch to control a constant speed 1/2 H. P. Motor, and flexible metal conduit to connect the Switch to the Motor. A rigid wood block and steel plate Base for mounting the Motor is in place in the lefthand opening of the Machine Base. The two-step Motor Pulley supplies the proper machine speed for use with the 1/2 H. P. Motor rated at 1150 R. P. M. See Figure 28 showing Motor mounting and note clockwise rotation as shown by arrow.

MOLD HOLDER

Taking Apart the Mold Holder

To disassemble the Mold Holder Base Plate Assembly (Fig. 23), start at a point where the machine has just completed a run of material not requiring the lifting of the matrix.

Clear a place on the bench and spread a piece of paper on which to place the parts as they are removed. Allow adequate room between the parts to avoid damage by contact. Follow the practice of removing each part in sequence as follows:

Since the machine was operating with the Matrix held down on the Mold, it will be necessary to place the front Ball Socket 12 and Nut 9 (Fig. 21) on the front end of the Toggle Link Operating Rod 10. Turn the machine until the Matrix Carrier Cam Lever 15 (Fig. 21) is at the front of its stroke, and turn the Nut until the Matrix is lifted and the pressure released from the Toggle Links 37 and 39. Remove the Toggle Link Pin 38 and loosen the Clamp Screw 14 to release the Toggle Link Operating Rod Assembly.

Lift out the lower Toggle Link 39 (Fig. 21) with the Matrix Carrier 47 and the Matrix 46. Be careful not to tilt the Matrix, as it is free to slide when removed from Guides 7 and 27 (Fig. 23), and may be damaged if dropped.

Turn off the water that has been permitted to run up to this time in order to cool the Mold parts sufficiently for handling. In turning off the water it is best to close the one main Supply Valve and leave the two Water Cocks 15 (Fig. 25) open so that the water will be adjusted the same when turned on again.

Remove the Mold Blade Coupling Screw 15 (Fig. 23) and Coupling 14 entirely. Damage to the parts may result if they are left on the machine and the hand wheel turned.

Loosen the Clamping Screw 35 (Fig. 23), remove the remaining product from the Mold and store with the Mold as a starting piece to be used when the Mold is again applied to the machine. Disconnect the Elbow Nut 42 on the Supply Pipe only. The Discharge Pipe remains on the front Bolster Block.

Caution: Make certain the machine is turned so that the Closure Cam Lever 24 (Fig. 21) is all the way to the front. Any attempt to remove the front Bolster 34 (Fig. 20) without regard to the position of the Closure Cam Lever may result in damage to the Closure 25 (Fig. 23). The front Bolster serves to hold the rear end of the Closure down when the Closure is in closed position under spring pressure. Removal of the Bolster when the Closure is in this position may allow the Closure to ride up over the Closure Stop Plate 8 (Fig.

24) thus damaging the Closure, Stop Plate or both. Turn the machine until the Closure Cam Lever is in its forward position, and do not turn the machine again until the front Bolster is reassembled into position.

Remove Nuts 18 and 29 (Fig. 23), Screws 28 in the front Bolster 34 and the four Screws 10. Lift off both Thrust Bars 5 and 23. Take out all four through Bolts. Push the Mold Blade 13 into the Mold so that the left end is nearly flush.

Remove the Matrix Guides 27 and 7. Remove the front Bolster 34 and drain the water from it. Remove the Mold Unit 32 complete, wipe it off and put it in its compartment in the Drawer of the machine together with a short piece of the product from this Mold Unit for use as a starting piece.

Disconnect the Elbow Nut 11 (Fig. 23). Remove the Screws 28 in the rear Bolster 3. Remove the Bolster and drain the water from it.

Taking Apart the Base Plate Assembly

Loosen the Clamp Screws 10 (Fig. 24) to free the Guide Plate 9, so that it may be removed. The Screws 26 (Fig. 23) and the Closure Shoe 24 are taken off so that the Closure 25 can be taken out. The following parts are now free to be lifted from the Base Plate 38: Guide Plate (left) 20 (Fig. 23), Stop Plate 8 (Fig. 24), Wedge 7, Abutment 6, Guide Plate (right) 30 (Fig. 23) and the Nozzle Seat 43 (Fig. 21). The two Abutments 36 (Fig. 23) are positioned in place on the Base Plate 38 and held in place by four Screws 37. These Abutments are set in the factory and should not be removed for any reason. They provide positioning points for the right Guide Plate, Closure, Stop Plate and left Guide Plate. Should these Abutments be disturbed they may alter the clearance provided for the free travel of the Closure. (At this point Nozzle adjustments described on page 20 should be checked.)

Assembling the Base Plate Assembly

The Mold Closure 16 (Fig. 21) is a sliding Plate between the upper side of the Nozzle Seat and the under side of the Mold. The Closure opens before the Piston downstroke begins and closes as the Piston is completing its downstroke. The bottom of the Mold opening is thus completely closed preventing any possibility of the metal flowing out or being sucked out should the Piston start on its up-stroke as the Nozzle is leaving the Mold. The Mold Closure is operated by the Rod 22 being pulled forward (opened) by the Cam Lever 24 and, when released by this Cam Lever, is closed by the Spring 18.

The Mold Closure 16 (Fig. 21) closes against the Stop Plate 48 that is adjusted by means of the Wedge 41 which is placed between the Stop Plate 48 and the Abutment 42. The end of the Mold Closure and its Stop Plate where they come

together are beveled on the under side to allow a smooth flow of metal from the Nozzle through the Closure opening and into the Mold.

The component parts of this assembly must be thoroughly cleaned. See that carbon deposits and burrs are removed from the Nozzle Seat, Closure and Closure Stop Plate. Clean the counter bored hole in the Base Plate to make sure that the Nozzle Seat fits without wobbling. (Refer to page 15, Mold Cleaning Instructions for cleaning these parts.)

Replace the right Mold Closure Guide Plate 30 (Fig. 23) and see that it is down tight and up against the Abutments 36. Replace the Stop Plate Abutment 6 (Fig. 24), the Mold Closure Stop Plate 8 with its Wedge 7 and the left Guide Plate 9, positioning this Plate so that it aligns with the right Plate.

Place one of the Matrix Guides on the Plates to keep them from springing up when adjusting the Clamp. Adjust the rear Screw 10 so that the Stop Plate can be moved with some effort and the front Screw 10 brought to a light bearing. Replace the Mold Closure 25 (Fig. 23), sliding it in from the front to clean its slot. Make sure that the Closure has the same clearance at the front of the Guide Plates as exists at its rear end.

Assembling the Mold Holder with Mold

The assembly of the Mold Holder with the Mold involves a complete knowledge of the functions and adjustments of the mechanisms that contribute to the actual casting and delivery operation. Their functions and adjustment are listed in the Index and must be considered in the following order:

Mold Closure and Stop Plate Adjustments
Mold Blade Gage
Mold Blade Operating Mechanism
Mold Blade Spring Box
Matrix Operating Mechanism

Study these instructions carefully and proceed with the following summary to complete the Mold Holder with the Mold Assembly and related adjustments.

For experience in assembling the Mold Holder and Mold it is suggested that a 6 point Style NR Mold .888" high be used. The Mold must be clean and free of oil, especially both ends of each Point Block. The extreme ends of the Point Blocks position the Mold against the Gage Plates 2 (Fig. 23) and the other ends of the Point Blocks serve to position the Matrix Guide 7.

To insert the Mold Blade in the Mold, place the mold with its bottom in contact with a flat surface and the slotted end of the front Block facing toward the right. Hold the Blade with its oil groove down and insert in the left end of the

Mold. The right end of the front Mold Block is slotted to permit flexing of the Block in that area, by pressure of the Pin and Adjusting Screw 35 (Fig. 23) in the front Bolster.

Place the rear Bolster in position on the Base Plate assembly and insert the Bolts 28 (Fig. 23). These Bolts are not to be tightened until the Mold and Bolster are correctly located. The Mold is placed in front of the rear Bolster and moved to locate the Mold Point Blocks against the Gage Plate 2 (Fig. 23) and Gage Plate 4 (Fig. 24). This positioning of the Mold is of prime importance because the accuracy of the complete Mold Holder assembly is dependent upon the positive position of the Mold against the Gage Plates and all component parts are located in relation to the Mold position.

Position the Mold against the Gage Plates and by applying pressure of the thumb and fingers, bring the rear Bolster to bearing against the Mold and hold it in position with gripping pressure of the fingers of the same hand, then tighten both Bolster Screws with a wrench held in the other hand. Check to see that both Mold Point Blocks are against the Gage Plates.

Place the front Bolster in position, and insert Screws 28 (Fig. 23). The rear Matrix Guide 7 has milled grooves to permit use of the Guide as a gage to line up both Bolster Blocks. The grooves fit over the projecting Mold Point Blocks to position the front Bolster. Insert the through Bolts 19, 22, 6 and 4, from the rear with the Thrust Bars 5 and 23 in position over the Bolts. Be sure the adjusting Screw 35 is backed off, and bring these Bolts and Screws to a light bearing.

Move the rear Matrix Guide to its normal position and insert Screws 10 and Washers 16 and bring to a light bearing that will permit moving the Guide forward by the knurled Screw 9. When the Guide is forward against the Point Blocks tighten the Screws 10.

Adjusting Mold Blade Stroke and Matrix Carrier

Assuming that a Matrix requiring a standard six pica stroke is to be used, engage the Mold Blade Spring Box with the Mold Blade Bell Crank, using the No. 2 position. (For the proper positioning of the Spring Box and Bell Crank when using other than a six pica stroke refer to Fig. 18.) Connect the Mold Blade to the Operating Bar using Coupling 7 and Screw 8 (Fig. 22).

Insert the Mold Blade Gage in an upright position between the Point Blocks of the Mold, pressing it against the rear Matrix Guide. Turn the machine until the Mold Blade has been moved to the left and stopped by the Micrometer Wedge and adjust Head 2, until the edge of the Mold Blade aligns with the left edge of the intermediate cut in the Gage and lock the Micrometer Wedge with its Nut.

Turn the Hand Wheel forward until the Mold Blade has been stopped by the right Micrometer Wedge and adjust the Wedge until the Mold Blade aligns with the right edge of the cut in the Gage and lock the Adjusting Head with Nut 14.

Let the Mold Blade Gage remain in place, and after cleaning the front Matrix Guide, place it on the machine, adjusting its position, until the Gage fits snugly but does not bind, between the front and rear Matrix Guides. Tighten Screws 10 (Fig. 23) to hold the front Guide in place. Remove the Gage.

Insert a starting piece in the right end of the Mold and tighten the Clamping Screw 35 (Fig. 23) until the material is held firmly. If set too tight it may cause the Mold Blade to "hang" when ejecting the product from the Mold. This adjustment requires resetting after the Mold has been heated during casting.

Hold Matrix Carrier 47 (Fig. 21), connected to the lower Link 39 with the small hole in the top of the Link to the rear, and insert the Matrix so that the symbols face front. Insert the Matrix and Matrix Carrier between the Matrix Guides and after replacing the Link Rod and Spring, etc., couple the upper and lower Links and the Rod using Pin 38. Loosen Screw 8 (Fig. 22) to be sure that the Mold Blade will not be sprung during the following procedure. Turn the machine until the Matrix is seated on the Mold and tap the top of the Rod 28 (Fig. 21) smartly with a pig of metal to be sure the Mold is seated firmly on the Closure Guide Plate. Tighten Screw 8 (Fig. 22). Tighten Bolts 19, 22, 6 and 4 and Screws 28 (Fig. 23).

Adjust the Bridge by turning the Adjusting Sleeve 31 (Fig. 21) up or down until the center of Pin 38 stands approximately 3/16" forward of a line from the center of Pin 35 and 40.

When a straight line rule or blank Matrix is used, remove Nut 11, Guard 49, Nut 9, and Socket 12, permitting the Matrix to remain seated on the Mold.

When casting Decorative Borders, Cut-off Dashes, or Logotypes, it is necessary to replace the Socket and Nut 9, and adjust them to raise the Matrix about 3/32" above the Mold, or sufficient clearance to allow ejection of the material. Replace Guard and lock Nut 11 against Nut 9.

Connect the water supply pipe, place oiler in position, put several drops of oil in the oil reservoir for the Mold Blade and in the hole in the front Matrix Guide Block over the Closure. Turn the machine over several times by hand, checking all adjustments before operating machine under power.

Adjusting Mold Closure and Stop Plate

To give an opening from the Nozzle into the Mold of the size and location best suited for the product to be cast, and to the Nozzles used, there are three

adjustments of the Mold Closure and Stop Plate, namely, adjustments of Adjusting Nut 20 (Fig. 21), Wedge 41, and Abutment 42.

Before making the adjustments, the complete Mold and Mold Holder Assembly must be in place on the machine. A 2 point Closure opening is required for 2 to 18 point incl. Molds. With a 2 point Mold the casting ends of the Stop Plate 48 (Fig. 21) and the Mold Closure 16 are set to line with the inside faces of the Mold Type Blocks. For larger point size Molds the 2 point opening should be centered between the inside faces of the Mold Type Blocks.

The Abutment 42 is free to move around so that the thick or thin side may be used as the abutment for the Wedge 41. The thick side to the front is used for 1, 2, 3 and 12 point Molds. The thin side to the front is used for 4, 6 and 18 point Molds. Assuming a 6 point Mold is on the machine, the thin side of the Abutment will be toward the front.

For a gage to establish the 2 point Closure opening and for centering the opening between the inside surfaces of the Mold Type Blocks, two pieces of 2 point brass rule or leads about five inches long should be used. Brass rule is preferable. Adjust the position of the Wedge 41 and the Adjusting Nut 20 on the Mold Closure operating Rod 22 to provide a centered opening of the Closure, greater than required.

The Mold Closure Cam Lever 24 must be at the front end of its stroke and the Stop Plate 48 must be to the rear. Place a piece of the 2 point lead in the Mold opening against the inside face of the front Mold Block. Prepare the other piece by shearing the end to form a point so that it will fit down into the Closure opening. Grasp the piece of 2 point lead that extends into the Closure opening with one hand and tap the Wedge with a piece of slug material to bring the Stop Plate forward to just touch the 2 point lead in the Closure opening. This will position the front end of the Stop Plate so that it extends two points into the Mold opening.

Adjust the position of the rear end of the Mold Closure by use of the tapered 2 point lead alone. The Closure is positioned by turning the knurled Nut 20 in or out on the Operating Rod 20 until it just touches the 2 point lead that extends into the Closure opening. This procedure will center the 2 point opening in the casting cavity. Lock the Nut 21 and check the opening with a new piece of 2 point lead.

Mold Blade Spring Box

The Mold Blade Spring Box must be adjusted to eliminate lost motion. The machine should be in rest position (no compression on Spring Box), and Lock Nut 8 (Fig. 19) and Adjusting Nut 9 should be loosened.

To make the adjustment, bring Adjusting Nut 9 (Fig. 19) just to bearing so that Rod 7 will have no motion in the Spring Box. Lock it tightly with Lock Nut 8.

Test to see that the adjustment holds and that there is no lost motion inside the Spring Box.

Turn the machine until the Mold Blade is all the way to the right, and note the compression on the Spring Box Rod 7 (Fig. 19), then turn the machine until the Mold Blade is all the way to the left. Note if the compression is equal in each movement. If not, release Lock Nut 6 and with a wrench applied to Nuts 8 or 9 equalize this compression by screwing the Rod 7 in or out of the Socket 5. After the compression is equal, lock the Lock Nut 6.

MATRIX OPERATING ADJUSTMENTS

Matrix Carrier Toggle Link Supporting Rod

One adjustment is required to insure that the Matrix will seat squarely on the Mold. If the Supporting Rod 28 (Fig. 21) is not free, it will hold the Toggle Link rigidly, and may prevent the Matrix from seating and cause squirts.

First adjust the Adjusting Nut 30 (Fig. 21), and then lock it with its Lock Nut 29 so that the Rod 28 in Sleeve 31 has about 1/32" movement.

Matrix Carrier Toggle Link

To position the Matrix Carrier Toggle Link, one adjustment is required.

With the Mold in place and Matrix 46 (Fig. 21) in the Matrix Carrier 47, turn the machine until the Matrix 46 is seated on the Mold, and the Matrix Carrier Toggle Link Operating Rod 10 is at the extreme end of its movement to the rear.

To make the adjustment turn the Sleeve 31 (Fig. 21) until the center Pin 38 is 3/16" out of line with the two Pins 35 and 40. This center Pin 38 must be "out of line" toward the front of the machine. It must not be allowed under any circumstances to be "out of line" toward the rear of the machine as this will mean that there is spring compression on the Matrix. Tighten the Lock Nut 32 and test to see that the adjustment holds.

This adjustment must be made each time a different height Mold is put on the machine. It is well to form the habit of noting whether this setting is correct before starting to cast after making any change of Mold or Matrix.

Matrix Carrier Toggle Link Operating Rod

There are two possible adjustments for the Matrix Carrier Toggle Link Operating Rod, depending on the material that will be cast.

To raise the Matrix high enough to clear the product for decorative borders, cut-off dashes, and similar products, back off the Nuts 9 and 11 (Fig. 21), and turn the machine until the Matrix 46 is seated on the Mold under compression of Spring 6. Have the Guard 49 between the Nuts 9 and 10.

Next, adjust the Nut 9 (Fig. 21) and lock it with Nut 11 against Guard 49 so that when Lever 15 is at the front end of its stroke, the Matrix 46 will be raised off the Mold far enough to clear the product. Matrices of .030" depth of drive should be raised about 1/16". Matrices of .065" depth of drive should be raised about 3/32".

Caution: This Guard 49 (Fig. 21) must always be in position when the machine is operating on material that requires the raising of the Matrix. Injury to the operator may result if it is left off.

When casting straight-line rules or leads and slugs, either fused or non-fused, the Matrix should be held constantly on the Mold.

To make the adjustment of the Matrix Carrier Toggle Link Operating Rod, have a Matrix in the Carrier 47 (Fig. 21) that does not require lifting from the Mold, for example, a straight-line rule or Blank Matrix.

Then remove entirely the two Nuts 7 and 9 (Fig. 21), the front Ball Socket 12, and the Guard 49.

PUMP MECHANISM ADJUSTMENTS

Connecting Rod

Connecting Rod 27 (Fig. 5) should be so adjusted in length that Crosshead 14 (Fig. 4) will not hammer on its Abutment on the Main Stand 15.

Pump Piston 1 (Fig. 6) should be in place during this adjustment. Back off the two Nuts 11 and 12 (Fig. 4) so that they cannot come against the Casting 10 during this adjustment. Loosen Nut 48 (Fig. 5) and run down the Stop 43.

With the Pump Handle 38 (Fig. 5) engaged as shown in Fig. 5, and the machine at rest, that is, when the top of the Pump Operating Cam Lever 40 is all the way to the rear and there is no compression on the Mold Blade Spring Box (Fig. 20), make the length of Rod 27 (Fig. 5) such that the Crosshead 14 (Fig.

4) will clear its Abutment 15 by 1/32". Be sure to test this clearance after both Lock Nuts 28 and 33 (Fig. 5) on Rod 27 are tightened. Note - Rod 27 has right- and left-hand threads.

After making this adjustment, and Rod 27 (Fig. 5) is locked with its Lock Nuts 28 and 33 on each end, swing the Handle 38 up and down a few times to make sure it enters properly the square hole in the Spring Clip 35. If it does not enter this square hold properly, loosen Lock Nut 33 and tighten it again after moving the Spring Clip 35 in the desired direction to bring its hole in line with the Handle.

Piston

The Piston should be clamped against the upper Stop Plate 3 (Fig. 6) of the Pump Body at all times, except when the Nozzle is in contact with the Mold. This is accomplished by adjusting Stop 43 (Fig. 5) and Stop Nut 25.

With the machine in the position of rest, back off the two Nuts 25 and 26 (Fig. 5). Loosen Lock Nut 48 and screw down the Stop 43 unless this has already been done as required in the preceding adjustment. When this is done, note that Piston 1 (Fig. 6) is locked against its Up-Stop 3 and that Latch 16 (Fig. 7) has clearance below it. The Pump Latch Handle 38 (Fig. 5) is to be engaged as shown.

Screw up the Stop 43 (Fig. 5) until it just touches Crosshead 45 and then screw it up one-half turn further. At this point Pin 6 (Fig. 6) will stand central in the hole in the Piston Lever 7. This is indicated by the fact that Pin 6 may be revolved freely with the fingers. Tighten the Nut 48 (Fig. 5) and see that the adjustment holds.

With the fingers, screw up Nut 11 (Fig. 4) just to bearing against Casting 10, then hold Nut 11 and tighten Lock Nut 12 against it.

Latch

Latch Plate 18 (Fig. 7) should clear Abutment Plate 19 when the Piston 1 (Fig. 6) is at the top of its stroke.

To make the adjustment, start with the machine in the position of rest. Adjust Nut 14 (Fig. 7) and lock it with Lock Nut 13 to give 1/64" clearance between Latch Plate 18 and Abutment Plate 19.

Pump Body Operating Rod

In order that the Nozzle may be seated before the Piston starts on its down stroke and be withdrawn early by the action of Stud 5, the position of Pump Body Operating Rod Lever 7 (Fig. 8) and Stud 5 should be properly adjusted.

Starting with the machine at rest, adjust Nut 6 (Fig. 9) and lock it with its Lock Nut 5 so that the Lever 2 will clear the Piston Lever 1 by 1/16" when the front of the Lever 2 is swung as far to the left as possible. Hold up Rod 4 (on which are Nuts 6 and 5) with the fingers in order to take up the lost motion when testing this adjustment.

Swing the Gag Plates 6 (Fig. 7) into position beneath the Latch 16 and turn the machine with Pump engaged until the Gag Plates 6 come within 1/32" of the Latch 16. In this position adjust the Stud 5 (Fig. 8) so that it just touches Lever 7. Then back off Stud 5 one-half turn and lock it with Lock Nut 6. This gives about 1/64" clearance between the lower end of Stud 5 and Lever 7.

Caution: Be careful not to screw Stud 5 down too far. If this is done, it will prevent the Piston returning to the top of its stroke, the Latch Plate 18 (Fig. 7) will not engage the Abutment Plate 19 and a "squirt" or other trouble will result. A wrong adjustment of this Stud 5 (Fig. 8) may be easily mistaken for a sticking Piston. If the Piston seems to stick, so that it does not rise to the top of its stroke, test first the adjustment of Stud 5.

In this position with Lever 3 (Fig. 3) free, examine the lower part of the Operating Rod 14. Make sure the Nozzle has been centered correctly. The Nozzle should now be held firmly against the Nozzle Seat 43 (Fig. 21) by the Pump Body Lifting Spring at the side of the Melting Pot and there should be no interference with the Pump Body Lifting Lever 15 (Fig. 3) to prevent its seating the Nozzle properly.

Take Rod 14 in the fingers and raise it so that Washer 5 comes against Lever 15 and see that there is 1/16" clearance between Washer 9 and the Swing Frame Casting 10. If necessary, adjust the position of either Washer 5 or 9 to obtain the required clearance. Then test again the adjustment of Nut 2 at the top of the Rod 14.

Piston Spring

Adjustment of the Nut at the upper end of Piston Spring Rod 1 (Fig. 5) is required to give proper Piston pressure.

The Nut should be placed with the knurled side up. Screw the Nut down or up on the upper end of the Piston Spring Rod (Fig. 5) to give sufficient pressure to get solid product and satisfactory weld.

MOLDS

Directions for Taking Apart, Cleaning and Reassembling

Do not take Molds apart unless necessary. Under proper conditions they will run for a long time, but a carbon deposit will collect on the casting faces of Molds. The deposit is a brownish film which burns on to the faces of the Type Blocks and gradually builds up so that it eventually interferes with the free ejection of the material. This may cause the Mold Blade to hang up and the Mold cannot operate satisfactorily.

It is then necessary to take the Mold apart in order to get at and remove the burned-on deposit. Never try to clean a Mold without taking it apart, for to do so will soon ruin the Mold. No cleaning or polishing compound should ever be fed into a Mold while operating.

To take the Mold apart, remove its four Screws, using a good screwdriver with a square point fitted to the slot in the Screws. The Monotype medium size casting machine screwdriver is best suited for this purpose. Be sure the point is dressed square so as not to damage the slot in the Screws.

The necessity for using the greatest care in cleaning Molds cannot be too strongly emphasized. The parts look simple, but they are precision ground with the greatest accuracy. Any careless or excessive rubbing when cleaning will damage the parts and make repair or replacement necessary.

Any carbon collected on Mold parts should be removed, but only the built-up carbon deposit and not discoloration in the steel. A hard Arkansas Stone is ideal for cleaning Mold parts. Extreme care must be exercised in its use so that the stone does not roll over an edge. It should be used with gasoline, kerosene or cleaning fluid. When the stone becomes dirty or flakes of metal adhere to it, clean it by rubbing on a new and true fine Carborundum Stone with gasoline, kerosene or cleaning fluid. A 1/2" x 1/2" x 3" hard Arkansas Stone has been found to be the most useful size. Do not use emery or commercial polishes as cleaning agents to remove carbon deposits from Monotype Molds.

It will be noted that Mold screws vary in length according to the point size of the Mold. When screw replacement is necessary, the Mold point size should be specified when ordering.

Reassembly

Reassembling the Mold requires the greatest care and patience to get the parts exactly right. The Mold is one piece of mechanism where "near enough" will not answer; the assembly must be "exactly right."

The component parts of the Mold having been previously cleaned, are assembled and the four screws brought to a light bearing to hold the assembly together, yet not so tight that the component parts will not be free to align properly in the ensuing jogging procedure.

A machined flat surface, such as the bed of a proof press or the top surface of the Main Stand in front of the Micrometer Wedge Stand will provide a good work surface to align the Mold. Place the top of the Mold in contact with the machined surface with the screws facing forward and hold the Mold down firmly. Use a piece of 12 point slug material to tap the extending ends of the Point Blocks, spreading them to assure maximum clearance for the Matrix Carrier and Matrix.

With the Mold in the same position, grasp both ends of the Mold with the thumbs and middle fingers, the index fingers being used to hold the Mold down. Lift one end of the Mold about three inches, while the other end is held firmly in contact with the machine surface; then bring the raised end down sharply on the machined surface. Alternate by jogging first one end and then the other three times, reducing the height that the Mold is lifted each time. Now hold the Mold down firmly with one hand and tighten the Screws a little more.

Check the alignment of the tops of each Point Block with the top surface of the Mold. If they do not align properly the Screws are too tight to permit free movement of the parts during the jogging action. Repeat the procedure until the point Blocks align properly with the top surface of the Mold.

Test the Type Blocks for alignment, by using the edge of a 6 or 12 point Mold Blade. This test is to be made on the bottom of the Mold in the area from the extreme left end of the Mold to the point where the left end of the right point projects into the Matrix opening of the Mold. Hold the Mold toward the light in one hand with its bottom surface up and its left end toward you. At the same time hold the Mold Blade at an angle so that the sharp edge can be used as a straight edge. The Mold Blade held at this angle and at right angle to its normal travel when in the Mold, is then placed in contact with the bottom left end of the Mold. With the Mold and Mold Blade held up to the light, see if the Mold Blade in contact with the Mold shuts out the light. Repeat the test at the point where the right Point Block projects into the Matrix opening; if the Mold Blade again shuts out the light, the alignment of the Type Blocks is perfect.

When the Mold Blade does not shut out the light it is because one of the Type Blocks is "high" and this high Block must be moved down to line up with the other one. To correct this condition return the Mold to the machined surface used in the assembly. Place the Mold with its top resting on this surface and tap the high Block at the test point very lightly with a small pig of metal. Repeat the test to assure alignment of the Type Blocks and tighten the Screws

securely. When the skill of Assembling and testing of a Mold is acquired, it becomes a simple routine task.

Caution: Be sure that the left Point Block is never below the two Type Blocks. It must be even with or may be slightly higher than, but never below. Damage to the Mold Blade and Closure Plates will otherwise result.

NOZZLES

The Nozzles recommended for use to cast all point size material from 1 to 36 point are shown in the following general chart. The threaded end of the Nozzle is provided with two different threads, one to screw into the Pump Body and the other to carry a Nut to lock the Nozzle securely after it is positioned.

The Nozzle should be screwed into the Pump Body so that its top surface extends approximately 1 5/8" above the surface of the Pump Body. Excessive variation of this extended height will affect the normal functioning of the Pump mechanism.

In general, the Nozzle 14H58 will take care of all point sizes from 1 point to 18 point inclusive. The hole in the tip is No. 48 drill size and for the larger point sizes this may have to be enlarged a little to obtain the best results. Linotype metal usually requires a slightly larger hole than Monotype metal. Do not make the hole larger than a No. 47 drill size. The hole in the tip of the Nozzle is made offset so that it can be brought central under the closure opening by turning the Nozzle. To use the Nozzle, set the closure opening to match the point size and position of the casting cavity in 1, 1 1/2 and 2 point molds. On larger molds make the closure opening 2 points and center it point ways under the casting cavity. Then turn Nozzle 14H58 until the offset hole in its tip comes central under the closure opening and offset to the right rather than left. To check this setting examine the product cast and if one side shows a fan-shaped or "hot spot" appearance, turn the Nozzle to bring the hole toward that side slightly and repeat until both sides look alike. For 24, 30 and 36 point, special Nozzles as listed are usually required. Other Nozzles listed in the parts list are older styles.

For each different product use the Nozzle that experience shows will give the best results. Start with the "Suggested Nozzle" shown in the TABLE on page 18 for each product, but if that does not give satisfactory results try the others until the best for the metal and other conditions in the plant is found.

Drilling the Nozzle

The single hole Nozzles should be cleaned from the top daily with a drill of the correct size. The multiple hole Nozzles should not be drilled from the

RECOMMENDED NOZZLES - MONOTYPE MATERIAL MAKING MACHINE

Point Size	Product	Cast in Picas	Speed in R. P. M.	Belt & Gear Plate IV	Temp. of Metal	Recommended Nozzles (2nd choice in parenthesis) Complete list in Parts Price List
1	Continuous Strip Leads - Low or High	6 to 8	100 to 128	10 to 12	600 to 725	14H58
1 1/2	Continuous Strip Leads - Low or High	6 to 8	100 to 128	10 to 12	600 to 725	14H58
	Continuous Strip Rules	6	100 to 128	10 to 12	600 to 725	14H58
2	Continuous Strip Leads - Low or High	6 to 8	100 to 128	10 to 12	600 to 700	14H58
	Continuous Strip Rules and Borders	6	100 to 128	10 to 12	600 to 700	14H58
	Cut-off Dashes	10 to 15	40 to 70	4 to 7	600 to 700	14H58 (C14H27)
	Column Width Leads - Low or High	10 to 15	40 to 70	4 to 7	600 to 700	14H58 (C14H27)
6	Continuous Strip Slugs - Low or High	6 to 8 1/2	60 to 90	6 to 9	575 to 650	14H58
	Continuous Strip Rules	6	60 to 80	6 to 8	575 to 650	14H58
	Continuous Strip Column Rules	6	60 to 80	6 to 8	575 to 650	14H58
	Continuous Strip Borders	6	60 to 70	6 to 7	575 to 650	14H58 (C14H23)
	Cut-off Dashes and Logotypes	10 to 15	40 to 60	4 to 6	575 to 650	14H58 (C14H34)
	Corner Piece Cut-off Dashes	10 to 15	40 to 60	4 to 6	575 to 650	14H58 (C14H34)
	Column Width Slugs - Low or High	10 to 15	40 to 60	4 to 6	575 to 650	14H58 (C14H34)
12	Continuous Strip Slugs - Low or High	6 to 8 1/2	40 to 60	4 to 6	575 to 625	14H58 ***
	Continuous Strip Rules	6	40 to 60	4 to 6	575 to 625	14H58 ***
	Continuous Strip Borders	6	40 to 60	4 to 6	575 to 625	14H58 *** (C14H23)
	Cut-off Dashes and Logotypes	10 to 15	30 to 40	3 to 4	575 to 625	14H58 *** (C14H34)
	Column Width Slugs - Low or High	10 to 15	30 to 40	3 to 4	575 to 625	14H58 *** (C14H34)
18	Continuous Strip Slugs - Low or High	6	18 to 25	*	575 to 625	14H58 *** (d14H22)
	Continuous Strip Rules	6	18 to 25	*	575 to 625	14H58 *** (d14H22)
	Continuous Strip Borders	6	14 to 25	*	575 to 625	14H58 *** (d14H22)
24	Continuous Strip Slugs - Low or High	6	14 to 18	**	575 to 625	14H43 (a14H32)
	Continuous Strip Rules - Low or High	6	14 to 18	**	575 to 625	14H43 (a14H32)
36	Continuous Strip Slugs - Low or High	6	14 to 18	**	575 to 625	14H44 (a14H32)
	Continuous Strip Rules - Low or High	6	14 to 18	**	575 to 625	14H44 (a14H32)

* Requires 18 Point Attachment.

** Requires 36 Point Attachment.

*** May require slight enlarging of supply hole in tip of Nozzle.

top, as this part of the passage is very short and does not clog up with dross. Attempting to drill such Nozzles from the top will damage them.

The number on all single hole Nozzles refers to the size of the drill to be used when drilling the Nozzle from the top. The TABLE below gives the necessary information for drilling each Nozzle.

Nozzle Number	Symbol	Distance Drilled up from Bottom*	Distance Left at Top	Drill Used from Top	Number of Holes in Top
None	14H58	2 7/32"	3/16"	No. 48	1
43	d14H22	2 7/32"	3/16"	No. 43	1
7	c14H23	2 1/4"	5/32"	**	3
9	c14H27	2 9/32"	1/8"	**	3
10	c14H34	2 9/32"	1/8"	**	3
None	a14H32	2 7/32"	3/16"	**	2
31	d14H13	2 7/32"	3/16"	No. 31	1

* Use No. 16 drill for drilling from the bottom in all Nozzles. Overall length of all Nozzles is 2 13/16".

** Do not drill multiple hole Nozzles from the top - the holes in the top can be cleaned with a small wire like a paper clip after the Nozzle is drilled from the bottom.

Multiple hole Nozzles, such as the three hole Nozzle, c14H23, must be positioned so that their holes will line up with the Closure opening. The two front Screws that fasten the Melting Pot 5 (Fig. 2) to the Pot Casting 6 are parallel with the travel of the Mold Blade when the Melting Pot is raised to casting position. When positioning the Nozzle see that the center line of the Nozzle holes are parallel with the center line of the Melting Pot Screws.

Nozzle Lube

The task of drilling Nozzles will be simplified and the time between drillings materially extended when a dross deterrent is used. Nozzle Lube, a Monotype product has proven to be very effective when used for this purpose. It is also excellent in cleaning and freeing sticking Pistons. Full directions are included with each box of 12 sticks.

The Nozzle Shield

The Nozzle Shield is used over the Nozzle to direct spitting of metal at the Nozzle into the Metal Pot, thus preventing the collection of metal on the bottom

of the Mold Base. On the old style Mold Base Plates the shield and screws must be removed to use the Nozzle Shield X88H.

Nozzle Adjustments

The Nozzle should be so positioned that the axis of the Nozzle will be perpendicular to the Mold when entered in the Nozzle Seat, so that there will be a tight joint between the Mold and the Nozzle.

To adjust the position of the Nozzle, remove the Mold, Matrix Guides, Bolsters, Closure, Closure Stop Plate, Closure Guide Plates, Nozzle Seat, Pump Piston, and Nozzle as explained on page 6. Loosen the three Pot Casing Screws 24 on the bottom of the Swing Frame Table 9 (Fig. 2).

Raise the Melting Pot into operating position and with the Pump Trip Handle 38 (Fig. 5) engaged, as shown in Fig. 5, and Latch 16 (Fig. 7) released, turn the machine to bring the Pump up to casting position.

Caution: The Nozzle Squaring Pin 1 (Fig. 1) must be preheated to prevent seizure in the Pump Body. Screw the Pin into the Pump Body in place of the Nozzle 3 (Fig. 2) for one-third of its thread length and allow time for the Pin to get hot.

Then loosen the Clamp Screw 18 and turn the Adjusting Pin 19 until Pin 1 (Fig. 1) is square with the top of the Mold Base Plate 38 (Fig. 23). Test this to front and rear with a square resting on the top surface of the Mold Base Plate. Tighten the Clamp Screw 18 (Fig. 2) and test again with the square to see that the adjustment holds.

NOTE: The Pin (Fig. 1) will stand square to right and left unless the Pump Body 5 (Fig. 10) or its Lifting Lever 17 (Fig. 2) is badly worn, in which case the worn parts should be replaced.

Remove the Squaring Pin 1 (Fig. 1).

To adjust the Nozzle so that it will enter the conical hole in the Nozzle Seat without dragging on the side of the cone, first screw the preheated Nozzle in place. Replace Nozzle Seat 43 (Fig. 21).

Caution: See that the Pump Piston 4 (Fig. 10) is removed to avoid any possibility of a "squirt" of hot metal.

The design of the Metal Pot and its compound Levers provide positive three point suspension for raising and lowering the Pump Body in a level plane. Clearance is also provided for the free movement of the Pump Body so that the Nozzle will form a perfect seal with the conical hole of the Nozzle Seat

when the Pump Body is raised to casting position. Place the front Bolster Block in position over the Nozzle Seat and clamp lightly with the end Bolts to hold the Seat in place.

Raise the Metal Pot to operating position and place a packing between the top Operating-Rod Nut 2 (Fig. 3) and the Operating-Rod Lever 3, so that when the Pump is raised, the Nozzle will stand about 1/16" below its position for contact with the Mold. Raise the Melting Pot into position. With the Pump Handle Trip 38 (Fig. 5) engaged, and Latch 16 (Fig. 7) released, slowly turn the machine to casting position, noting the travel of the Nozzle on its up stroke.

By moving the Pump on its supports inside the Pot to the right and left, and to the front and rear, the Nozzle can be seen to move slightly from one side or the other of the conical hole in the Nozzle Seat. The position of the Pot must be adjusted so that this slight movement of the Nozzle is equal in all four directions from the center of the conical hole in the Nozzle Seat.

To move the Nozzle to the front or rear, turn the Adjusting Screw 21 (Fig. 2) in the required direction.

To move the Nozzle to the right or left, turn the Adjusting Screw 8 in the required direction. (Lower the Melting Pot to reach the Screw 8.)

Remove the Packing Piece from between Nut 2 (Fig. 3) and Lever 3.

Tighten the Casing Screws 24 (Fig. 2).

CLEANING THE PUMP BODY

After prolonged operation, the metal channel in the Pump Body will require cleaning to remove dross accumulation. The Valve and Valve Seat may become worn causing reduced piston pressure through leakage. Either condition will cause the Pump to produce inferior quality material.

Before attempting to clean a Pump Body be sure spare Plugs, Valve Seat, Valve Plug, Intake Valve and Plug (bottom) shown as 3, 7, 8, 11, 12 and 13 (Fig. 10) are at hand.

Remove the Piston and Nozzle from the Pump Body. Have the necessary wrenches ready at a vise, and open the vise jaws to grasp the flats of the Pump Body Plug 8.

To remove the Pump Body from the Metal Pot, swing the Piston and Pump Levers 7 and 17 (Fig. 6) from contact with the Pump Body. Grasp the Sleeve

13 (Fig. 2) with pipe pliers and lift the nozzle end of the Pump Body to release it from the Lifting Lever 1 and the drilled guide boss in the bottom of the Metal Pot 5, then move the Pump Body forward to release it from Pin 15 (bearing for Pump Body). The Pump Body is now free to lift from the metal pot and drain through the Nozzle end. Use a stuff scrub brush to remove the type metal that clings to the Pump Body. In removing the parts for cleaning and drilling, speed is required to loosen (not remove) all the parts before the remaining type metal in the Pump Body chills and solidifies. Any attempt to loosen the parts of a chilled Pump Body may result in breakage of the Pump Body.

Grip the bottom Plug 8 (Fig. 10) in the vise with the Pump Body standing erect as in casting position. Tamp the arm of the Pump Body with a pig of type metal in a counter-clockwise direction to loosen the bottom Plug 8, but do not unscrew it. Loosen Nut 9 and take out the Regulating Screw 10. Loosen Plugs 3, 7 and 13 and Valve Seat 11. If the parts cool before this work is completed, return the Pump Body to the Melting Pot to reheat it. All Plugs and the Valve Seat may now be removed as well as Valve 12.

By this time the Pump Body will be cooled sufficiently that it may be drilled without damage to the Pump Arm Drill. The Pump Arm is to be drilled from the Nozzle end where Plug 3 (Fig. 10) is taken out. A 5/16" Pump Arm Drill is used. Be very careful not to run the drill down far enough to injure the threads in the bottom of the Pump where Plug 8 screws in. The connecting hole from the diagonal hole to the Nozzle is large and seldom clogs, but should be tested with a 5/16" drill to be sure it is clear. A 3/16" drill should also be run through the hole from which Plug 7 (Fig. 10) was removed. This clears the passage from the Valve Chamber into the Pump Body.

The type metal in the Melting Pot should be cleaned and the dross removed by skimming. The parts removed from the Pump Body should be dropped into the Melting Pot to remove type metal and dross. Remove the parts one at a time and brush thoroughly. Examine Valve 12 and Valve Seat 11 (Fig. 10) for evidence of pitting. Pitting must be removed by use of valve grinding compound. Place three light dabs of grinding compound on the tapered surface of the Valve and insert the Valve in the Valve Seat. Hold the Valve Seat in the vise to prevent turning and use a screw driver in the slot provided in the Valve to apply pressure and motion as limited by wrist action.

Advance the position of the Valve about 1/3 of a turn to distribute grinding action. About two minutes of grinding should produce good bearing surfaces on Valve and Valve Seat. Clean both parts thoroughly by washing them in gasoline or kerosene to remove compound.

The assembly of the Pump Body is the reverse procedure of taking it apart. Apply a little graphite and oil mixture to all threaded parts. Be sure the

Valve is in proper position before inserting the Valve Plug and Valve Seat. Screw the matching Plugs and Pump Body Plug to position by hand and insert regulating Screw and Nut. The Regulating Screw will be adjusted after the Pump has been in casting operation for the material being run.

Experience has proven that it is good practice to put the Pump Body back in the Metal Pot so that all parts will be uniformly heated, then return the Pump Body to the vise and tighten all Plugs and the Valve Seat to a snug bearing to prevent leakage. The tapped hole for the Nozzle in the Pump Body may require retapping to clean the threads. A 5/8" - 13 thread tap should be used.

CASTING PROCEDURE

Length and Position of Mold Blade Stroke

The length of stroke for the Mold Blade is determined by the use of the proper hole in the Mold Blade Bell Crank 1 (Fig. 18). The range of stroke in picas is given for different kinds of products, whether fused or non-fused in Table in Figure 18.

The accurate length and position of the stroke in relation to the Matrix and Closure opening is controlled by the Wedges 9 and 10 (Fig. 17), that serve as stops for the casting and ejecting positions of the Mold Blade.

There are three different conditions governing the use of the Bell Crank and Micrometer Wedges:

First: When the product is continuous strip leads or slugs cast with a Blank Matrix without any drive in it, that is never raised off the Mold. The length of stroke should be determined and the Adjusting Stud 3 (Fig. 19) placed in the proper hole in the Bell Crank 4. Turn machine until there is no compression on the Spring Box.

Screw down the left Micrometer Wedge 10 (Fig. 17) with the right Knurled Head 15 as far as it will go and back it off one turn and lock it with its Lock Nut 14. This is approximately the correct position of the Wedge for all lengths of stroke for fusion material. Check it by seeing that the right end of the Mold Blade stops about 1/16" to the right of the Closure.

Turn the machine until the Mold Blade is at the right end of its stroke. Note the position on the Scale on the Stand 3 (Fig. 22) where the "0" on the Mold Blade Operating Rod 2 comes when in the right hand position. From this mark, count back the number of picas of the length of stroke desired, marking this on the Scale on Stand 3 with a pencil. Turn the machine until the Mold Blade is at the left end of its stroke and note whether the "0" comes to the

pencil mark. If it does not come exactly to the mark, the right Micrometer Wedge 9 (Fig. 17) must be raised or lowered by unlocking the Lock Nut 3, and raising or lowering the left Knurled Head 2 until the "0" (Fig. 22) comes to the pencil mark when compression is on the Spring Box. Tighten the Lock Nut 3 (Fig. 17) and note that the compression on the Spring Box is about equal at each end of its stroke. If it is unequal, loosen Nut 6 (Fig. 19) and screw Rod in or out of its Socket 5 until the compression is equalized.

Second: Continuous strip rule is cast with a Matrix having a driven face of straight line or lines, and will permit ejection of the cast without lifting the Matrix. The left or casting position of the Mold Blade must be set so that the head bearing of the drive in the Matrix aligns perfectly with the end of the Mold Blade. The adjustment for positioning the travel of the Mold Blade to the right or ejecting position may remain the same as the setting for fusion material as given under "First." In effect, this means that a slight variation in the length of cast for strip rule material is acceptable, provided the position of the rule on the material body aligns perfectly at the point of fusion.

Third: When the product is cast from a Matrix that must be raised at each stroke, such as logotypes, corner pieces, and other non-fused products of an exact length, both Micrometer Wedges 9 and 10 (Fig. 17) must be used to determine exactly the location of each end of the stroke in addition to positioning Stud 3 (Fig. 19) in proper hole of Bell Crank 4.

The above settings are approximate and must be tested by casting product. Therefore, proceed as follows:

Starting to Cast

Swing the Mold Oiler into position and turn on the oil. Put a few drops in the left end of the opening between Matrix Guides 7 and 27 (Fig. 23) to reach the right end of the Mold Blade, oil the Mold Closure 25 with a few drops of oil in the hole in the front Matrix Guide, and place a few drops into the same opening that the Mold Oiler feeds to be sure the Mold is oiled while the Mold Oiler is getting into action.

Caution: Use only "Rule Mold Oil" for oiling Monotype Molds. The use of any oil other than "Rule Mold Oil" will cause trouble with casting and with the Molds themselves.

Run sufficient material to warm up the Mold. Do not have the metal any hotter than necessary to get good fusion after the Mold is warmed up. It may be necessary to start with a little hotter temperature, but this should be reduced as low as will permit good fusion after the Mold is warmed up. If the product has imperfections in body and face, make sure first that the Pump Body and Nozzle are clean, and that the Piston Spring is set for the point size being cast.

Small Point Sizes

For material 3 points or smaller there are two different style Molds, one for fused material and one for non-fused material. The Mold Blade for non-fused material is straight on the casting end. The Mold Blade for fused material has the casting end curved. The regular setting of the Mold Blade stroke as described in the section under "Mold Blade Operating Mechanism" will bring the straight end Blade for non-fusion and the fusion Blade which is curved both top and bottom on the casting end into the correct operating position without change.

If the top casting corner of the curved end Blade of these small point size Molds is set to the Mold Blade Gage 1 (Fig. 29) at each end of the stroke it will give a 6 pica stroke with the ends of the stroke matching the design in the standard border Matrices. This setting is usually necessary when casting from decorative design Matrices on these Molds.

When using these curved end Blades to cast from rule Matrices and from some decorative border Matrices where the design permits, the right end of the stroke may be shortened several points to give better fusion. This is done by readjusting the Micrometer Wedges to suit.

When running leads from curved end Blades use the same Micrometer Wedge setting as for straight end Blades. This keeps the 6 pica stroke but moves the whole stroke to the left, bringing the fusion point closer to the Closure for better weld.

In all cases be sure there is equal compression on the Mold Blade Spring Box after the stroke has been set.

CUTTER TRIPPING ATTACHMENT

The Cutter Tripping Attachment is designed to trip the Cutter mechanically, thus assuring the delivery of 1 point material in lengths of 24 casts. Normally the Cutter is tripped by the material as it moves to the right, and presses against the Shear Gage 20, or Shear Gage Lug 21, Plate 11, (Fig. 14). The pressure required to move the Shear Blade Guide 6 (Fig. 12) to tripping position would buckle 1 point material.

Application

Refer to Plate V (Fig. 32). Remove the Supporting Beam Bolt 4 and place the Cutter Trip Finger 1 in position so that the lower or finger end will contact the Shear Blade Guide 2. Replace the Bolt and tighten to hold the Trip Finger securely in place.

The Cutter Bracket Bolt 1 (Fig. 31) is in place on the machine. Place the complete assembly over this Bolt, as shown and line up the Ratchet Wheel Pawl Carrier 3 by moving the Carrier to the front or rear to mesh with the Cutter Rock Shaft Tooth 157F4 (not shown in sketch). Lower the assembly to position on the machine, apply the nut and tighten lightly. Move the assembly to the right so that Trip Cam 6 contacts the Cutter Trip Finger 1 (Fig. 32) and tighten the nut securely.

Start the machine in low speed to determine if the Shear Blade Guide 2 (Fig. 32) is moved enough to activate the Cutter mechanism. If not, it will be necessary to move the Cutter Tripping assembly closer to Trip Finger 1, to assure tripping of the Cutter.

Guide Plate X177F furnished for two point material may be used to guide material into the Shear Blade Guide 2 (Fig. 32). It is held in place under the Cutter Tripping assembly (Fig. 31).

DECORATIVE BORDERS

It is assumed that the adjustments under the heading "Matrix Operating Mechanism," insuring that the Matrix is lifting high enough to clear the material, and the setting of the stroke in accordance with instructions under "Length of Stroke," have been made.

Decorative border Matrices of all point sizes have the designs complete in 6 picas, with the exception of certain hard-to-cast borders such as lithotone which use 4 pica stroke and a few special designs that cannot be made to conform to 6 picas.

Place Matrix 46 (Fig. 21) in its Matrix Carrier 47 and be sure that the Toggle Link Mechanism is properly adjusted and that the Guard 49 (Fig. 21) is in place.

Take a piece of material matching the border to be cast, and cut it at the fusion point. With the Mold Blade at the extreme left, insert the material into the Mold from the right until it touches the Blade. Then turn the machine over to bring the Blade to the right hand position. Tighten the Clamping Screw 35 (Fig. 23) to insure that the material will not be driven from the Mold by the force of the Pump stroke.

If no border material of the same pattern is available, use a piece of lead or slug of the height of the Mold. Remove the Matrix and fill the right (delivery) end of the drive in the Matrix with a heavy soap or electrotypers' wax and smooth the soap or wax off even with the surface of the Matrix. This will prevent the escape of metal on the first cast.

Turn the machine over by hand to be sure everything is correct. Start the machine under power and throw in the Pump Handle 24 (Fig. 19) just long enough to get one cast and repeat these single casts until four or five have been made. This method is used for safety in case there should be a squirt, since the matching of the border design has not yet been done.

Loosen the Clamping Screw 35 (Fig. 23), pull the material out of the Mold and see if the end of the design comes exactly to the end of the body on the last cast. If it hangs over, screw up on the left Micrometer Adjusting Screw 4 (Fig. 17) to raise the right Micrometer Wedge, but if the design comes short of the end of the body, screw down on the Adjusting Screw. Always lock the Adjusting Screw by means of the Lock Nut 3. Replace the piece of material in the Mold, tighten the Clamping Screw 35 (Fig. 23), and repeat the test until design and body exactly match on the end. This adjustment should not be changed while running this design.

Next is to match the design at the right end of the stroke. Throw in the Pump and cast about half a full length strip and cut it by tripping the Cutter by hand. An experienced operator can usually check the matching of the design by a careful examination of the product under an eye glass. If the match is not exact, the left Micrometer Wedge 10 (Fig. 17) is to be moved by means of the right hand Screw 13 and Head 15. If the design straddling a weld comes short, raise the Screw, but if it comes long, lower the Screw. Only a very slight amount of adjustment should be necessary. This method of matching the design can be applied to all point sizes and to practically all designs. Check the design match from time to time during the run.

CASTING NON-FUSION MATERIAL

When putting on the Mold for casting single column-width material, instead of pushing a long piece of product in from the right to close the exit of the Mold after the Mold has been entirely assembled in its Holder, it is cometimes more satisfactory to use two or three pieces of the non-fusion product to be cast. Be sure the Toggle Link mechanism is set to lift the Matrix high enough to clear the product to be cast from the Matrix being used. Also be sure the Mold is the correct height to suit the depth of drive of the Matrix being used. For .065" drive cut-off dashes an .853" high Mold must be used; for column-width decorative end cut-off dashes a Mold .888" high is required; while for the special .015" drive 2 point classified ad rule Matrix, a Mold .903" high is needed.

Setting the Stroke for Non-fusion

Figure 22 shows the Scale on the Micrometer Wedge Stand 3 graduated in Picas from "0" to "15".

The maximum length of stroke for non-fusion cast is 15 picas, that is obtained by having the Stud 3 (Fig. 19) in the hole 7 (Fig. 18) and the Micrometer Wedges 9 and 10 (Fig. 17) raised as far as possible.

If a cast of 15 picas is desired, turn the machine until the Mold Blade is at the right end of its stroke and note that the "0" on the Mold Blade Operating Rod 2 (Fig. 22) comes to the "15" mark on the Scale on Stand 3. Adjustment of the left Wedge 10 (Fig. 17) is made by moving the right Knurled Head 15 and should be so made that the mark "0" on the Mold Blade Operating Rod 2 (Fig. 22) stops at the "15" mark on the Scale on Stand 3.

Then turn the machine until the Mold Blade is at the left end of its stroke and adjust the right Wedge 9 (Fig. 17) with the left Knurled Head 2 until the "0" on the Operating Rod 2 (Fig. 22) comes to the "0" on the Scale on Stand 3.

The above setting positions the stroke so that the Closure opening will come about in the middle of the 15 pica cast.

If a narrower column width of, for example, 13 picas is required, then both Micrometer Wedges should be moved to shorten the stroke equally at each end, or in this case, one pica at each end. The "0" on the Operating Rod 2 (Fig. 22) would then stop at "14" on the right and at "1" on the left. This method keeps the Closure at the center of the non-fusion cast. It is, of course, understood that the Closure adjustment is made in accordance with the standard instructions for setting the Closures.

Logotype Attachment

This attachment is used on the Material Making Machine for casting a slug with characters on one edge similar to the slugs produced on slug composing machines. In fact, slug machines Matrices are used to produce the characters with this attachment.

The length of the slug can be varied to suit requirements but the maximum length is 15 picas and the shortest length is usually about 5 picas.

The printing face may be the full length of the body or may be as much less than the body length as desired. The face may be placed anywhere on the body although the nearer the middle, the easier it is to get good faces.

These Logotypes are used for such purposes as stubs for stock tables, for baseball scores, for financial and racing news, headings of various kinds and many other specialties. Five point is the smallest regularly supplied, but any point size up to 18 point can be furnished. For 18 point, the Eighteen Point Attachment (which see) is of course required.

The equipment consists in general of a special Matrix Carrier, Toggle Link, Mold Holder, Cutter Bracket (for short casts), Shear Blade, Cutter Rock Shaft, Stacker Bar, Nozzle, Water Pipe Extensions and Gage.

A No. 9 Nozzle is used, Symbol c14H27, having three holes.

Style NRG Molds are used, which are similar to Style NR2G Molds except for height and clearance custs for the ears of the slug Matrices. They are provided with Trimmer Knives to shave any overhanging bevel from both sides of the product as it comes from the Mold, and are of the proper height (.875") to produce a logotype slug of type height from slug machine Matrices.

In addition to casting non-fusion as described above, this same Mold will also cast continuous strip material the same as regular Molds, slugs .875" high from a Blank Matrix and rules from special .043" drive rule Matrices.

The directions for placing the Mold in position on the machine and adjustment of the Closure and Stop Plate are the same as for other Molds of like point size.

The Gage a25L2 is provided for setting the Mold Blade in the left hand position to correspond to the head bearing of the Matrices assembled in the Matrix Carrier and to give proper clearance between the Matrix Guides.

The usual procedure is followed for casting material either fusion or non-fusion.

Automatic Stacker-Cutter for Non-fusion Material (Column-Width)

There are four adjustments for the Stacker Cutter. These are: positioning of the fixed Shear Blade 16 (Fig. 16) to insure a free line of travel for the product; positioning of the opening in Bracket 12 to prevent bending of the product when Shear acts; positioning of Guide 15 to support the product on the rear side and guide it into the Shear opening; and positioning the Cutter so that the cutting edge comes exactly at the point of non-fusion of the product.

Before making any adjustments to the Staker-Cutter, move all parts of the Cutter and Stacker for non-fused material out of the way so that the product has a clear path, just as for long lengths of fused material.

Adjust the Mold Blade to produce the exact length of non-fused product desired with the face properly positioned on the cast column-width way. Make several trial casts to ascertain the product is uniform and moved out from the Mold the correct distance. Make one cast at a time removing each with the fingers to make sure it does not tilt or jam against the parts of the Cutter for long fused material.

Stop the machine with the Mold Blade in its extreme right position with the end of the last cast projecting from the Mold normally. This insures that the product cannot be pushed back into the Mold during the adjustment since it is backed up by the Blade. Examine the end of the material to see that it has no burrs from partial weld to the previous cast, and is smoothly clean. Then put the Stacker on the machine, move to the left until Shear 14 is close to the end of the product, and clamp the Stacker with Bolt 13 (Fig. 16).

To position the fixed Shear Blade 16 (Fig. 16) to insure a free line of travel for the product, first loosen Screw 18 (Fig. 16) and adjust the fixed Shear Blade 16 by turning Adjusting Screw 17 until the front of the Shear opening in it comes flush with the front of the corresponding opening in Bracket 12. Lock Blade 16 forward against Screw 17, making sure the adjustment holds.

To prevent bending the product when Shear acts, first loosen Bolts 6 (Fig. 16) and turn Screw 19 to move Bracket 12 forward or back until the front side of the Shear opening in it just touches the front side of the product coming from Mold. Then tighten Bolts 6 while at the same time holding Bracket 12 forward so that front Bolt 6 bears against Screw 19, and make sure the adjustment holds. A similar adjustment must be made for each change of point size.

To support the product on the rear side and guide it into the Shear opening, an adjustment of Guide 15 is required. First loosen Screw 11 (Fig. 16), and slide Guide 15 forward until it just touches the rear of the product as it comes from the Mold. Then tighten Screw 11, making sure the adjustment holds. The Guide should support the product, but must not bind or mark it. The adjustment must be made for each change of point size.

The Cutter Blade should be adjusted so that its cutting edge comes exactly at the point of non-fusion of the product.

First loosen Bolt 13 (Fig. 16). Raise Spring Clip 2 and move the Rock Shaft 1 to the left to disconnect Arm 25 from the Pin 26 which operates it. Move Shear-Blade Carrier 5 forward until Shear Blade 14 covers the opening through which the product is to pass. Next move the entire Shear mechanism to the left until the side of Shear Blade 14 comes against the end of the product projecting from the Mold. Tighten Bolt 13 and test with the Shear in action. (Rock Shaft 1 should be at the right with Arm 25 engaging Pin 26.) Make sure the adjustment holds. If the Shear cuts a shaving from either end of the product, readjust to correct this.

When moving the Cutter and holding it to tighten Bolt 13 (Fig. 16), do not tilt or press down on Bracket 12. If it is tilted so that it is clamped unevenly when Bolt 13 is tightened, it will cut the end of the strip diagonally instead of square across.

When making the shorter non-fused casts, it may not be possible to move the Shear Mechanism close enough to the Mold to take the first length of cast outside the Mold. If this is the case, move the Shear mechanism to the right to take the second piece out of the Mold. The first piece will be held in position by Guide 15 (Fig. 16) for delivery. No non-fusion material can be cast and stacked shorter than 9 picas in length.

Stacker Bar

The Stacker Bar may be adjusted both sideways and front and back to receive and support the product as it comes from the Mold and is pushed into the column.

First put in position the Stacker Bar mechanism and insert Bolt 43 (Fig. 16). Adjust Stacker Bar 22, front and rear, so that the lug at the rear end will just clear the rear side of the product as it comes from the Mold. Likewise adjust the Bar right and left so that the product will compress Spring 21 as it comes from the Mold, just enough to keep the product standing erect and prevent it from falling back into the path of the next piece after it has been pushed forward by Shear Blade 14.

Tighten Bolt 43 and test the setting by making several trial casts, observing how the pieces are received and stacks. It is recommended that the Pump be operated during the tests, so that one cast is made every few revolutions.

Similar adjustments must be made for each change of product, both point size and length.

ADJUSTMENTS FOR AUTOMATIC CUTTER AND STACKER FOR CONTINUOUS STRIPS

Transfer Bars

The Transfer Bars 7 and 8 must be adjusted to carry the product forward far enough to clear the front end of Shear Gage Lug 21 (Fig. 14) and open far enough to release 12 point material at the proper position. They also must be brought in line with the opening in Shear Blade Guide 6 (Fig. 12) so that the product will enter the Transfer Bars properly.

First trip the Cutter and turn the machine with a 2 point lead in the Cutter until the Shear Blade comes against the lead, ready to cut it. The Transfer Bar should be from 4 to 6 points back of the front end of Shear Gage Lug 21. No adjustment is required because the fitting of the parts is sufficient.

To adjust Transfer Bars 7 and 8 (Fig. 13) to carry the product forward far enough to clear the front end of Shear Gage Lug 21 (Fig. 14) and open far

enough to release 12 point material at the proper position, first turn the machine with the Cutter tripped until Transfer Bars 7 and 8 (Fig. 13) are all the way forward. Hold the Transfer Bars toward the rear by pressing with the fingers against their left Hangers 10 and 11 (Fig. 12), adjusting Screw 34 (Fig. 13) in the lower end of Lever 6 and locking with Lock Nut 33 to get from 14 to 16 points between Transfer Bars 7 and 8. The Hangers should now just touch the steps of Stacker Guard 4 (Fig. 12) with not over 1/32" clearance between front Hanger 11 and the front step of Guard 4. Transfer Bars 7 and 8 (Fig. 13) must not press against Guard 4 (Fig. 12) not spring it forward as this would wear Lever 6 (Fig. 13). Test this adjustment to make sure it holds.

With the machine turned so that Transfer Bars 7 and 8 are all the way forward, the front face of the Rear Transfer Bar 7 should be from 1/16" to 3/32" in front of the front end of Shear Gage Lug 21 (Fig. 14) (the Lug at the left end of the Shear Gage) when the Shear Gage is positioned opposite the left Bracket. If it is less than 1/16", bend Guards 4 (Fig. 12 and 13 (Fig. 15) as well as Guards 1 and 14 (Fig. 11) toward the front, and readjust Adjusting Screw 34 (Fig. 13) in Lever 6.

To bring transfer Bars 7 and 8 (Fig. 13) in line with the opening in Shear Blade Guide 6 (Fig. 12) so that the product will enter the Transfer Bars properly, first turn the machine so that the Shear Blade is all the way to the rear and adjust the Adjusting Screw 14 (Fig. 13) to bring the Transfer Bars 7 and 8 in line with the opening in the Shear Blade Guide 6 (Fig. 12). To test, place a piece of 6 point strip material between Transfer Bars 7 and 8 (Fig. 13) and extending into the opening in Shear Blade Guide 6 (Fig. 12).

Shear Blade Shoe Tube Friction Plate

Tensions adjustments must be made to insure accurate length of cut material, preventing overthrow or rebound of floating Shear Blade Shoe Tube 27 (Fig. 14).

Test Spring 13 (Fig. 14). Replace if has been stretched, weakened or shortened.

Adjust Friction Plate 16 (Fig. 14) to make it as stiff as possible, and just let Spring 13 return Guide 6 (Fig. 12) to the left with the machine running. Vibration of the running machine helps the return of the Guide. To adjust the Friction Plate 16 (Fig. 14), remove and bend its two fingers so that when replaced on the machine they will press a little too hard against Tube 27. Oil the Tube where Friction Plate 16 bears and, with the machine running, bend the fingers back a little at a time until they will just let the Guide 6 (Fig. 12) return to the left after a stroke to the right.

Spring 13 (Fig. 14) and Friction Plate 16 have been replaced by a shock absorbing Shear Blade Tube Weight (assembly). The Weight restores the Shear Blade Shoe Tube assembly against its stop, and the energy expended by the sudden stop is absorbed by the spring and buffer in the Weight spring box, thus assuring positive return of the Shear Blade Tube without rebound and repeating operation of the Cutter mechanism.

Guide Plate

To adjust the Guide Plate 4 (Fig. 11) to support 2 point and smaller material, place on machine with its Collar 5 using Bolt 13 (Fig. 16) to hold it (same bolt as used for the non-fusion Stacker).

Place Guide Plate as far to the right as possible without interfering with the Cutter. While casting material, align the Guide Plate by swinging its right end slightly front or back to be sure that the material does not rub on either side of the Guide Plate. Then tighten Nut 9 (Fig. 16).

Lead or rule may be obtained in any length up to 25" by adjusting the position of the Shear Gage.

First loosen Clamp Screw 26 (Fig. 14) and slide the complete Shear Gage to the right or left on Tube 27 until Lugs 20 or 21 against which the lead or rule strikes, is the required distance as measured by a gage, from the cutting edge of Shear Blade 13 (Fig. 12). Tighten Clamp Screw 26 (Fig. 14). Make a few trial casts, adjusting for exact length by the Micrometer Adjusting Nut 15.

Always use Lug 21 (Fig. 14) on the Shear Gage, which is nearest the Cutter Blade (to the left) except when the lead or rule is too long. It is then necessary to use the fixed Lug 20 at the right.

No material to be cut and stacked should be over 25" long. When casting any long leads or rules there should be at least 1/32" clearance between the Shear Gage and the right hand Guide 8 (Fig. 15), when the lead or rule has pushed the Shear Gage 20 (Fig. 14) to the far right.

Never cut leads or rules any length less than the stroke of the Mold Blade. Do not lengthen the stroke of the Mold Blade on fused material beyond the ability of the Cutter to handle it. The stroke of the Mold Blade, added to the movement required to trip the Cutter must be within the total movement of Shear Blade Guide 6 (Fig. 12).

Stacker Bar Adjusting Stand Adjusting Screws

To make continuous strip material straight, adjustment of the height of the corner of Galley Plate 38 (Fig. 16) is required.

First cast two long lengths of material and place them foot to foot. If they touch in the middle and not at the ends, the rear right corner of Galley Plate 38 (Fig. 16) over which the product passed is too high. If they touch at the ends and not in the middle, it is too low.

To correct the lack of uniformity, adjust the rear right corner of Galley Plate 38 (Fig. 16) up or down at Screws 39 and 40 until two pieces of product placed foot to foot will touch along their entire length.

Each time a Mold is changed the test should be repeated. On long continuous casts the test should be made from time to time as a check.

Screw 40 (Fig. 16) bears against the upper side of Galley Plate 38, while Screw 39 passes through the Plate and has a head beneath it. To raise the corner of the Galley Plate 38, back off Screw 40 the desired amount, then back out Screw 39 until it brings Plate 38 up tight against Screw 40.

To lower the Plate, screw down Screw 39 the desired amount, then tighten Screw 40 until it is firm against Plate 38.

Guide Roller

The Guide Roller must be adjusted for alightment and height to prevent material raising. Before making the adjustment, the Stacker Bar Adjusting Stand Adjusting Screws (see preceding adjustment) must be in proper position. Guide Roller Bracket 10 (Fig. 11) may be used either alone or on top of Guide Plate 4 in place of its Collar 5. Use Bolt 13 (Fig. 16) (same bolt as used for non-fusion Stacker and Guide Plate).

When running column rule steel Roller a178F7 is substituted for the rubber-faced Roller 12 (Fig. 11). It is grooved so that it does not touch the face of the rule but bears only on the level.

First line up Roller 12 (Fig. 11) correctly with the travel of the product. Adjust the height of the Roller by turning Handle 9 to bring the Roller down against the top of the product when the product is resting solidly on the Mold Holder Base and on the rear right (adjustable) corner of Galley Plate 38 (Fig. 16) adjusted as described above under "Stacker Bar Adjusting Stand Adjusting Screws."

Short Lengths

Accurate cutting and stacking of short lengths (15 picas or less) may be achieved by substituting special parts on the Automatic Cutter. These parts are the special broad Pawl Finger 7 (Fig. 11) and special Shear Stop 8 for the Cutter Head.

Standard Screw 48 (Fig. 16) and Spring 47 are used with the special parts.

The broad Finger 7 (Fig. 11) is applied in place of the regular narrow Finger 27 (Fig. 16) in exactly the same position, using Screw 48 and Spring 47. Stop 8 (Fig. 11) is held in position by Bolt 43 (Fig. 16) and the rear end of Stop 8 is placed to the left of Shear Blade Guide 6 (Fig. 12) between Shear Blade Guide and its Abutment, pulling the Shear Blade Guide to the right to place Stop 8 (Fig. 11) in this position.

The broad Finger and Stop keep Shear Blade Guide 6 (Fig. 12) to the far right at all times so that the short lengths will enter farther into Transfer Bars 7 and 8 (Fig. 13) before being cut and the Transfer Bars can grip them and carry them into proper position on the galley for stacking.

When broad Finger 7 and Stop 8 are used, the stroke of the Mold Blade must never exceed one inch. If a longer stroke is used with these parts, the Cutter will jam, and breakage may result. When changing from short lengths to long and increasing the stroke beyond one inch, remove both broad Finger 7 and Stop 8 and replace with the regular narrow Finger 17 (Fig. 13).

EIGHTEEN POINT ATTACHMENT

The standard Material Making Machine is equipped to cast, shear and deliver material up to and including 12 point. Eighteen point material requires some modification of the machine to accomplish the necessary reduction of speed and provide for shearing and delivery of the material.

The Material Making Machine parts list furnishes the symbol number of the parts required for 18 point material. The Molds listed are styles NRA, NRAG and NRA2G which produce material with a recess 6 points deep in the front side. This material is readily cast, sheared and delivered by the Eighteen Point Attachment.

The Speed Reducing Device is readily applied by referring to Figure 27 for relative position of the component parts.

Shear Blade Guide b84F2F (Fig. 34) is equipped with a removable Reducing Attachment. With this attachment in place, material of 1 to 9 points will clear the Guide for shearing. For casting above nine points, remove the reducing attachment.

On machines prior to Serial Number 11897, the old style Cutter Bracket (for short leads) can be used by applying the new style Cutter Bracket Shear Blade Carrier, a156F15F and Cutter Rock Shaft and Tooth a157F4F.

When using the 18 point attachment the standard settings for Closure and Stop Plate are to be followed. Speed should be varied with the material being cast and the type of metal being used. Speed can be determined best by trial, and will be found to average from 18 to 25 r.p.m. Water regulation is about the same as for 12 point material.

Standard instructions for setting the Mold Blade, length of stroke and matching of border matrices should be followed.

36 POINT ATTACHMENT

Application of Attachment to Existing Machines, and Adjustments and Operating Instructions

Mold Holder Base Plate Assembly

Remove Bridge 55A1 and the rear Bridge Support 56A1. Take off the standard Mold Holder group Xc252E complete.

Put on the 36 point Mold Holder group a252E77E complete.

Before replacing the Bridge and Bridge Support, remove the Rock Shaft 157F1F and replace it with the 36 point Rock Shaft a157F4F having the higher Tooth a157F4. The newer model Material Making Machines are equipped with a new style Shear Blade Carrier having a high notch to correspond with the high Tooth a157F4 in the Rock Shaft. The new Rock Shaft should therefore be left on the machine permanently, and there should be no interference when changing back to 12 point and smaller. (Earlier model machines did not have a high enough notch in the Shear Blade Carrier to fit the new high Tooth.)

Replace the rear Bridge Support 56A1 and Bridge 55A1.

Cutter and Galley

Remove the Galley Plate b160F1 for short leads together with the Cutter Bracket group X156F, the Stacker Bar group X172F for short leads and the Stacker Bar Adjusting Stand group X173F.

Loosen the Set Screws 162F2 holding the Galley Support Bars and remove the Galley Xa78F4 complete with the Drawer X174F.

Remove Cutter Cam Lever Pawl a207E2E complete with its Spring 207E7 and also the Shear Yoke Spring group X171F.

Remove the Cutter completely by taking out four screws in the right side of its Bracket and two from the rear.

Put on the new non-fusion Galley Plate b160F1, which is the same as the older model except there are two holes but in it to permit the use of a speed wrench on the Set Screws 162F2 (which clamp the Galley Support Bars).

Put on the new Knife Blade Bracket group X184F which fastens in place of the Stacker Bar Adjusting Stand group X173F which was removed. This Knife Blade Bracket is to be applied with the Knife Blade toward the rear for the purpose of adjusting the Galley. For all sizes larger than 18 point and any other material that is cast in full length strips by the non-fusion method, this Bracket is to be turned with the Knife Blade toward the front and the beveled end toward the rear.

Put on the 36 point Galley complete, sliding its Support Bars into the holes in the Main Bracket.

Take off the two Springs 188F12, which hold the Stacker Bar on the new Galley toward the rear, and push the Stacker Bar all the way toward the front, which carries the rear Shear Blade to the front with it. Put a .002" feeler between the front and rear Shear Blades and push the complete Galley to the left until the rear Shear Blade comes up against the feeler. Clamp the Galley in that position with the same Set Screws 162F2 used to clamp the standard Galley, using the speed wrench provided for adjusting of the Mold Holder. Also use the same bolt and nut (no washer) used for the non-fusion Stacker (or collar) to clamp the end of the Galley where the counter is. The feeler gives .002" clearance between the two Blades and insures that one will not strike the other when cutting material 18 point and smaller. The Shear is never to be used on anything larger than 18 point. For all larger sizes, non-fusion must be employed.

Turn the Ratchet 180F7, connected with the counting mechanism, by hand and make sure that the Cutter Cam Lever Pawl Trip Lever 181F1 does not jam between the Trip Button on the Disc and the Plunger 181F5 in the Galley. Also make sure that when it is pushed all the way down by the Trip Button in the Disc, the Trip Lever clears the underside of the Cutter Cam Lever Pawl Finger a207E18, which replaces the standard one.

Caution: Cutter Cam Level Pawl a207E17E is to be turned over toward the back so that it is inoperative until after proper adjustment has been made between the Counter Disc and the Counter Ratchet which is described later.

Be sure to turn the Knife Blade Bracket 184F2 around with the Knife toward the front and the beveled end toward the rear for 36 point.

Mold Blade Gag Block

To apply the Mold Blade Gag Block 187F1 to a machine on which the left end of the upper Micrometer Wedge Stand 237E15 has not been machined square,

it is necessary to file the left end of the Micrometer Wedge Stand (upper) 237E15 to make it parallel with the head on the Mold Blade Operating Rod and to make the distance from the left end of the Stand to the center of the first rear screw hole 1/2". It is only necessary to file the left end for a distance of 5/8" up from the bottom of the Stand. To test whether the facing of the left end of the Stand is correct, try it by putting on a new Bracket 187F6 (which holds the Gag Block with its Lever) so that the screw holes in it line up with the two left hand rear screw holes in the upper Micrometer Wedge Stand 237E15 and clamp it with two new Screws 187F7 which replace two of the old Screws 237E16. If the facing is correct, the face of the Lever holding the Gag Block will be square with the surface that has just been faced.

Having replaced the upper Micrometer Wedge Stand 237E15 and applied the new Mold Blade Gag Block 187F1 complete with its Bracket, adjust the Support Stud 187F20 in the new Bracket to bear against the top Stand of the machine and lock it with its Lock Nut.

When changing back to sizes 18 point and smaller, and cutting them with the Shear instead of non-fusing, the Gag Block is locked out of action by screwing down Screw 187F22 in the left end of the Gag Block Bracket 187F6. This presses down on the rear end of the Gag Block Lever 187F4 and raises the Gag Block permanently out of the path of the Mold Blade Operating Rod.

Put on the Gag Block Operating Rod 187F11, connecting its Forked End 187F12 with Bell Crank 187F 9 which operates the Gag Block Lever 187F4. Adjust the Trip Block 187F16 on the right end of the Operating Rod so that when it is pushed to the left by the Trip Button 180F11 on the Counter Ratchet 180F7 it will raise the Gag Block and its Lever to clear the Mold Blade Operating Rod by 1/16" to 1/8".

Put in the Ratchet Pawl Lever Operating Link 180F15 which hooks over the Cutter Rock Shaft Tooth and connects to the Ratchet Pawl Lever by means of a notch in the Link engaging a screw in the Pawl Lever. This completes the operating mechanism for the counter.

Use the No. 5 hole in the Mold Blade Bell Crank to establish the stroke of the Mold Blade.

Set the travel of the Mold Blade to the 1" stroke, using the regular gage for that purpose. The stroke to the left is adjusted in the usual manner by the Micrometer Adjusting Screw. The stroke to the right is adjusted by means of the new Gag Block which comes between the left end of the Micrometer Stand and the head of the Mold Blade Operating Rod. The Gag Block is adjustable on its Lever by means of two screws and diagonal slots. With the stroke adjusted to the correct length, adjust the other Micrometer Adjusting Screw so that when the Gag Block is raised for a non-fusion stroke, it will

give a stroke between 1 5/8" and 1 3/4" as may be found by trial to be the best non-fusion.

Bolster Clamping Screw

In the front right end of the front Bolster there is a different clamping arrangement. Clamping Pin a252E86 has a large head on the rear end and a small shank toward the front. Adjusting Screw a252E87, which is really a hollow nut, goes around the shank of the Clamping Pin and bears against the underside of the Pin head. The Adjusting Screw should be so adjusted to give just enough pressure on the Clamping Pin to prevent the material from drawing back with the stroke of the Blade toward the left. It should not give any pressure to prevent the material blowing out of the Mold as that is taken care of by another adjustment. The hollow nut, Adjusting Screw a 252E87, is adjusted by means of a special hollow wrench or Screw Driver 67L1.

Put on the new Clamp Pin Auxiliary Pressure Lever Bracket 186F6 which screws to the right front corner of the front Bolster. Connect the Pressure Lever 186F1 to this Bracket on the right end, using Pin 186F4 having the small head. Connect the left end of the Pressure Lever to the Connecting Eye 186F9 on the rear end of the Spring Rod 186F8 by means of the Pin 186F5 having the large head. The front end of this Spring Rod passes through an eye on the Bracket 186F12 which fastens to the Matrix Carrier Cam Lever 227E1E at proper height to keep the parts in line. There are two springs on the Spring Rod (inner Spring 186F7 and outer Spring 186F16).

On the front end of Spring Rod 186F8 there are two Nuts 186F10 which are to be adjusted to bring the head of the large headed Pin in the eye on the rear of the Rod out from under the through Bolt in the Bolster. This is for the purpose of permitting the Pin to be taken out when removing the Pressure Lever to adjust the Clamping Pin a252E86 by means of its Adjusting Screw a252E87 and the Screw Driver 67L1 as described above.

In the right end of Pressure Lever 186F1 is a Pressure Screw 186F2 and nut. With the machine turned so that the Matrix Carrier Cam Lever is all the way to the front, turn this Pressure Screw in until it just touches Clamping Pin a252E86 in the Bolster and then back off the Pressure Screw a quarter turn and lock it with its lock nut. This insures that there will be no pressure on the Pressure Screw at the time the material is being ejected, but that all the pressure will go on during the time of casting to prevent the material blowing out to the right under the pressure of the Pump.

The new Spring operating the Closure is a heavier Spring and can be distinguished by the fact that it is a cut Spring having a square cross section, while the superseded Spring is made of round material. The symbol of the new Spring is a241E8. There is also a new heavier Spring, manufacturing number

6282 in the Mold Blade Spring Box X238E. Both of these springs are on all machines Nos. 11897 and following.

Speed Reducing Device

All machines now being shipped have a large broad face Pulley in place of the Step Pulley formerly furnished. The machines especially equipped to receive the 36 point attachment have a Sprocket on the Motor Pulley. On machines not completely equipped it may be necessary to apply the new Intermediate Pulley complete with Bracket. Drive out the Shaft 69H1 for the Pump Bell Crank, and replace with the new Shaft or Fulcrum Pin a69H2, which is long enough so that the Intermediate Pulley Bracket hangs on the end which extends toward the left beyond the base of the machine. The Shaft or Fulcrum Pin is held by a Set Screw in the rear which must be backed off when driving out the old Shaft and tightened after putting in place the new one. There is a Collar and Set Screw to hold the Bracket in place on the end of the Shaft. The lower end of the Intermediate Pulley Bracket slips over the Stud in the lower part of the Base, which also acts as one of the supports for the Guard. Put the Roller Chain in place and swing the Intermediate Pulley to the rear to tighten the Roller Chain and clamp it with its two nuts and washers, one either side of the lower end of the Bracket on the Stud. Do not make this Chain too tight but just tight enough to prevent any flapping with changes in speed or when starting and stopping. There is a new extension for the Belt Tightener Arm Spring. This is symboled a200E2. It is about 1" shorter than the former extension. The extension is not required when the Belt goes from the Motor Pulley to the machine Pulley, but it is required when the Belt goes from the Intermediate Pulley to the Machine Pulley.

Operating Instructions

Best operating conditions for the 36 point attachment are:

Metal temperature	about 625 degrees
Speed	about 16 R. P. M. for 36 point about 26 R. P. M. for 24 point
Closure opening	about .060" for 36 point and approximately central
Water	sufficient to keep the Mold cool to the touch.

Caution: Before putting the Mold on the machine, soak the Oil Pads in the Type Blocks well with oil. Also see that the Mold has plenty of oil at the start, and that the Blade is thoroughly oiled before putting it into place.

If gasoline or any other cleaning fluid is used to clean the Mold, be sure the Oil Pads in the Type Blocks are removed before cleaning takes place. If the Oil Pads should become saturated with cleaning fluid, all the oil would be

removed and they would not be able to absorb any oil until the cleaning fluid had evaporated completely. Be sure to soak these Pads well with Monotype Rule Mold Oil and replace them in the Type Blocks. Set the Mold Oiler to feed about one drop to every fifteen casts, using Monotype Rule Mold Oil. Use sufficient oil to prevent hanging up, but do not use more oil than necessary. The amount can be determined by trial.

Always take the Mold Blade out from the right of the Mold and replace it from the right. Most Blades have a head which would prevent their passing the Point Block on the left. For the same reason be careful never to connect the Mold Blade Spring Box to any hole in the Bell Crank which would draw the Blade back to the left far enough to permit the head on the Blade to hit the Point Block.

The adjustment of the Mold Blade stroke has been given previously in these instructions (see page 38).

If the Mold is taken apart, care should be used to be sure the Point Blocks are correctly positioned so that they will not interfere with the Matrix being inserted when the Mold is on the machine. There is sometimes play enough in the screw holes so that the Point Blocks could be positioned so near together that the Matrix would not go between them.

The Matrices in sizes larger than 18 point are the male style and extend down into the Mold. A special Matrix Carrier a57A10A is used to hold this style of Matrix.

Caution: When stopping casting, or if a hang-up occurs while casting, be sure to immediately turn the Cutter Cam Lever Pawl a207E17 over toward the back, so that it is out of action. This Pawl is never to be turned to the front into operating position until after the Counter Disk has been set in proper relation to the Counter Ratchet 180F7 (as hereafter described) so that the non-fusion cast comes at the correct position for delivering the strip onto the galley. This can only be established by casting trial strips and removing by hand until the setting is correct.

Unfluted 36 point Nozzles a14H31 for linotype metal and a14H32 for Monotype metal are to be positioned with the vent hole to the right and the supply hole in the tip pointing to the left, toward the Mold Blade. The Nozzle Shield X88H, consisting of a hollow cone supported by two spring arms resting on the Melting Pot is to be used with these Nozzles (also with fluted Nozzles) and if the Nozzle Seat Shield 252E53 is on the machine it is to be removed.

The Vent Tube Nozzles (14H44 for linotype metal and 14H43 for Monotype metal are positioned with the Vent Tube to the right, which turns the supply hole toward the Mold Blade. The Nozzle should be screwed into the Pump

Body until the tip is about 1 5/8" above the surface of the Pump Body, and with the holes in the tip in line with the travel of the product. No Nozzle Shield of any kind is to be used with Nozzles having a Vent Tube. Have the heat about 625 degrees. Adjust to give very little drop to the Nozzle.

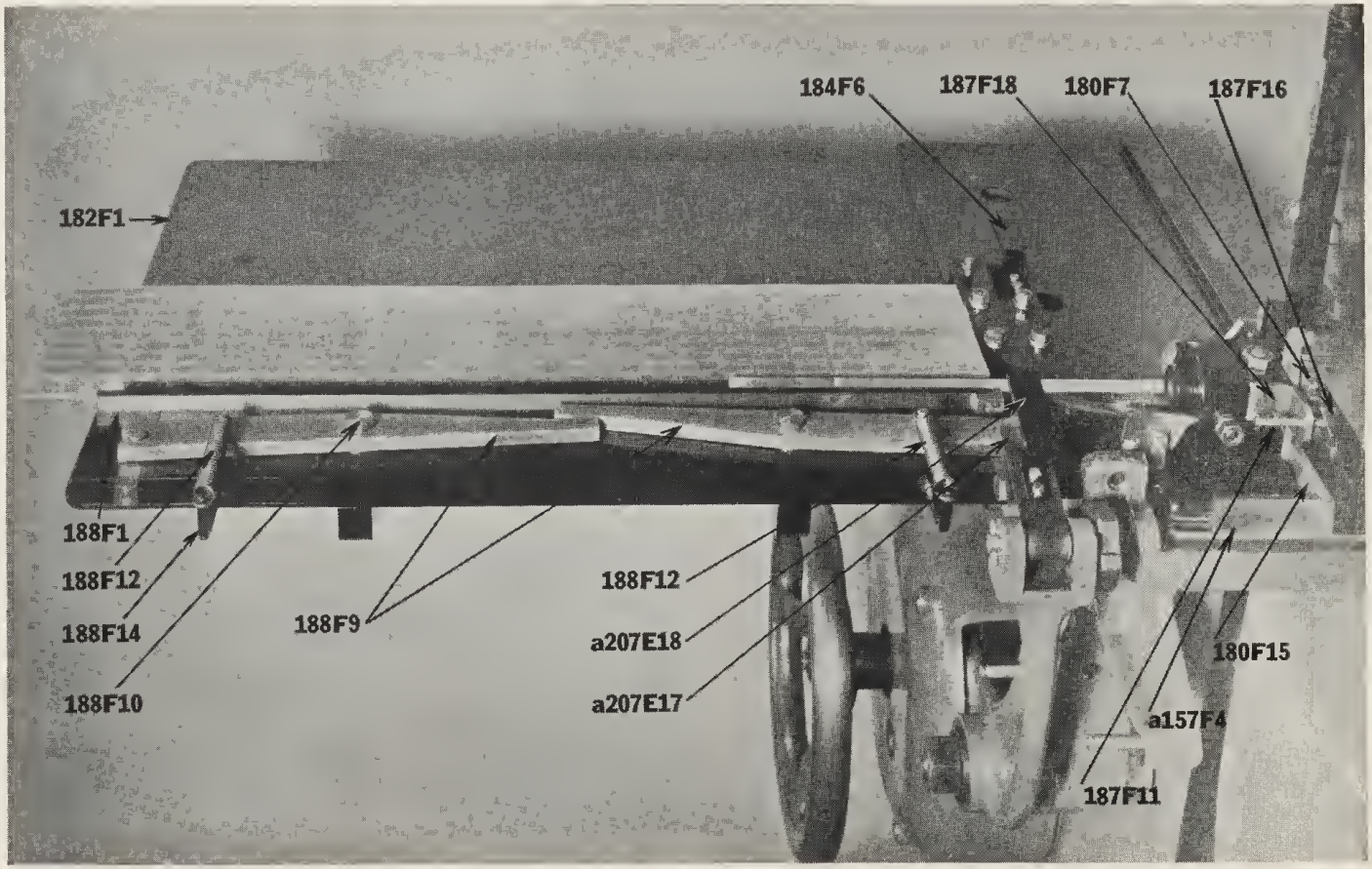
Adjusting Counter

Start casting material and adjust the Counter in relation to the Ratchet, so that when the non-fusion point between two strips of material comes about midway between the beveled rear end of the Knife Blade Bracket and the rear Knife, the Cutter Cam Lever Pawl will be dropped and the material pushed onto the Galley. This can only be determined by trial casting, and the Cutter Cam Lever Pawl must be left turned toward the back so that it is inoperative and the material must be separated by hand until it is established that the tripping does come at the correct point - otherwise the material would be jammed and damage might result.

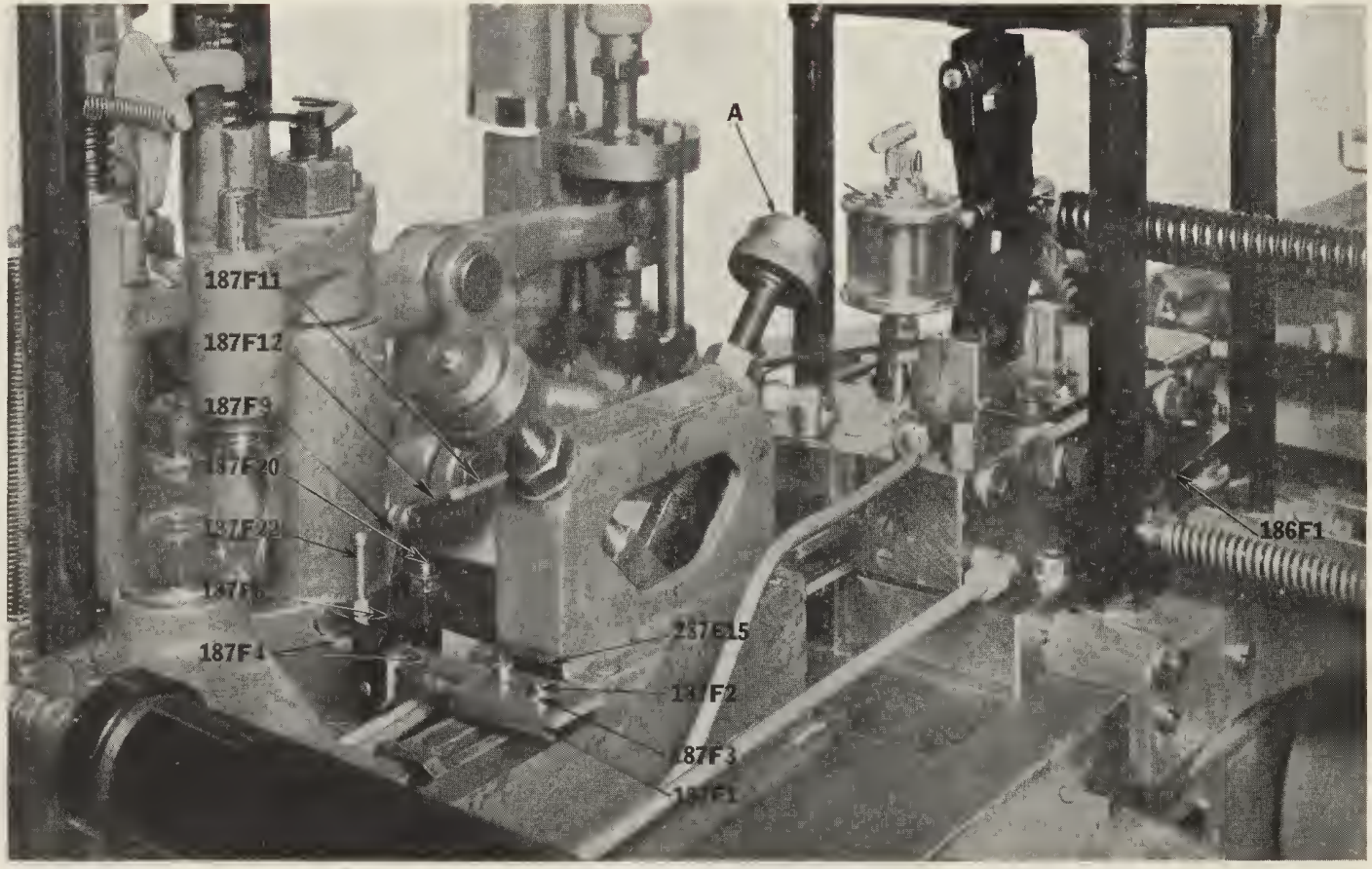
After the Counter Disk 180F3 has been properly set and clamped with its Set Screw 180F4, then, and not until then, the Cutter Cam Lever Pawl a207E17 may be turned toward the front and put into action.

Adjust the Guide Roller 180F17 on the front of the Counter Block 180F1 to keep the material straight as it comes from the Mold.

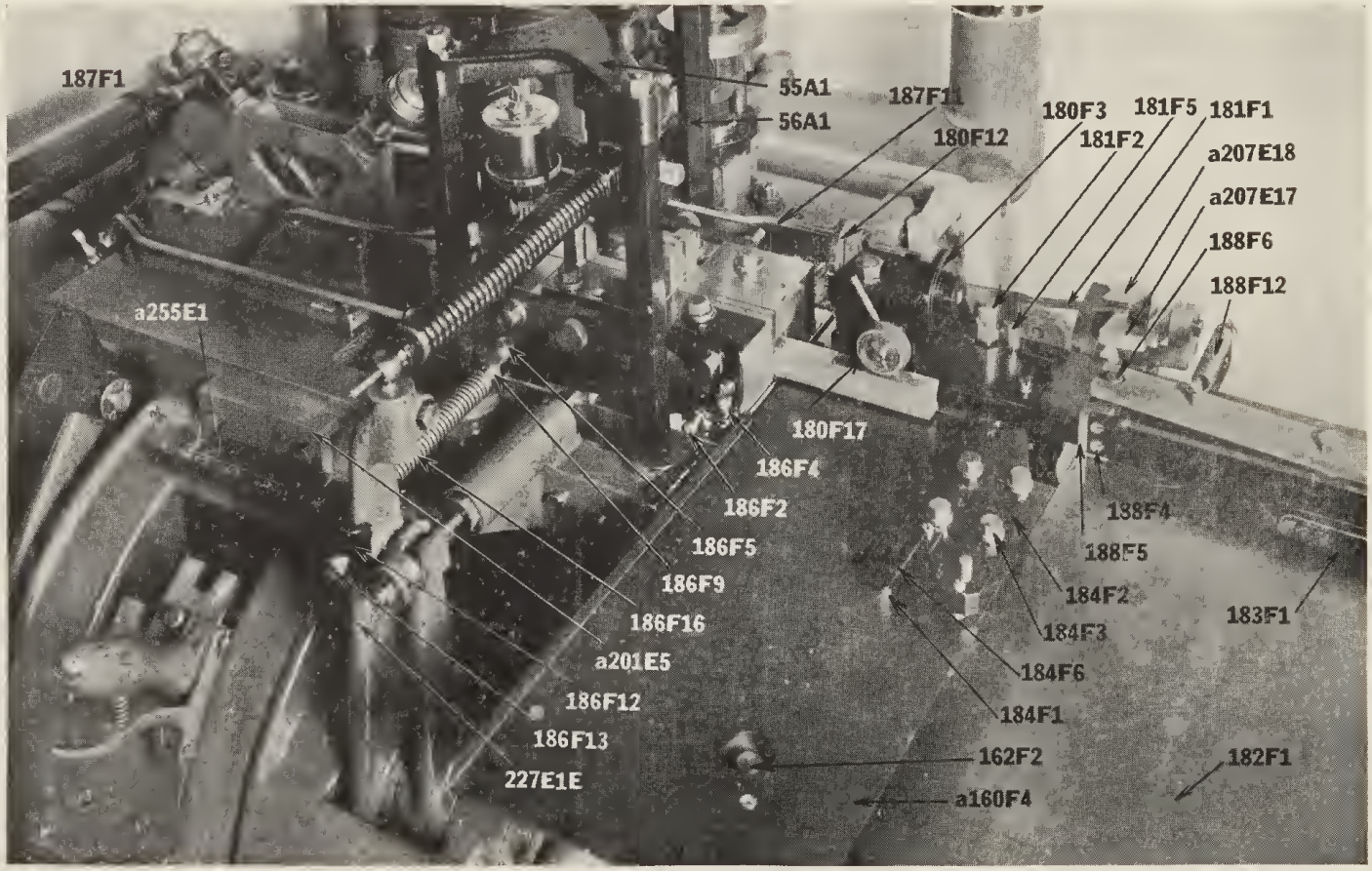
About midway of the Galley there is a Support 183F1 for the strip of material being cast. This is adjusted by means of the Thumb Screw 183F2 underneath the Galley, to keep the material from sagging.



CUTTER AND STACKER MECHANISM PLATE A



SIZING MECHANISM PLATE B



CLAMPING AND COUNTING MECHANISM

PLATE C

GENERAL OPERATING INSTRUCTIONS AND RECAPITULATION

Direction of Rotation: The Motor Pulley runs clockwise, looking at the machine from the left end; that is, the top of the Pulley moves toward the front of the machine.

Speed: The machine has a Gear Shift which provides for four different speeds. It also has a two Step Pulley on the Motor that doubles the number of speeds, making a total of eight different speeds obtainable on the machine. The ratio of these speeds is given on the Plate (see Fig. 26) located above the Gear Shift Handle. The approximate speed in revolutions per minute is obtained by multiplying these ratio numbers by 10 for the motors furnished with the machine (speed of 1150 R. P. M.) The Cone Pulley referred to on this Plate is the one on the Motor.

The average speeds for the various products and ratio numbers on the Plate which will give approximately these speeds are shown in the Table on page 18.

Remember that these speeds are what may be expected after the Mold is heated up under proper running conditions. When starting in the morning, or after the machine has been standing, it should be started on slower speed until all parts are heated up and under normal running conditions. The speed may then be gradually increased until the maximum satisfactory speed is found for the particular product being cast.

The Length of the Cast depends principally upon the product to be cast. On borders the length of cast is fixed by the design and cannot be varied. On other material, especially leads and slugs, the length of cast may be varied somewhat to suit the character of the type metal, speed, temperature of the metal, and the amount of water being used. The average length of cast for different products of the various point sizes is shown in the Table on page 18 and a reference to the chart with Fig. 18 will show in which hole in the Bell Crank 4 (Fig. 19) the Mold Blade Bell Crank Stud 3 should be placed to give this length of cast.

Note: The length of stroke for casting leads and slugs, both high and low, as given in the Table, is six to eight and one-half picas, thus materially increasing machine production.

The average temperature for most products is about 600° to 625° for standard metal. When casting 2 point product a higher temperature may be used, and in fact is sometimes required, especially on rule work. Do not, however, blame a chilled appearance or failure to fuse on the metal temperature being too low. In the majority of cases this is caused by the temperature of the Mold being too low due either to too much water or not having been casting long enough to properly heat up the Mold - the Mold should be hot to the hand.

When using other than standard type metal the temperature will have to be varied to suit.

There is a separate valve to control the flow of water through each of the two Mold Bolsters. The flow of water should be about equal through each. Whether sufficient water is being used can usually be determined from the appearance of the metal. A chilled appearance indicates that too much water is being used. A blistered body may be caused by too little water as well as too high metal temperature, too fast a speed, or incorrect size of Mold Closure opening.

When starting in the morning, or after stopping to change Molds, or for any other reason, get the Pot up into casting position as soon as possible to heat the Mold. Run no water through the Mold until casting is started and the Mold is heated up. When casting is stopped temporarily, shut off the water at once and leave the Melting Pot raised, to keep the Mold heated. If the machine is stopped for the purpose of changing the Mold, the water should be permitted to run and the Melting Pot should be lowered, so that the Mold will cool off sufficiently for handling.

Oiling: Before starting the machine for the first time, fill the Cam Case with Monotype Machine Oil until the oil shows in the sight feed Elbow. This requires approximately 2 2/3 gallons of oil. Do not bring the oil to the top of the Elbow, but just have it in sight.

The oil in the Cam Case lubricates the Cams and Cam Lever Rollers. The Drive Shaft and Cam Shaft are oiled through separate oil pipes or holes leading to the Bearings at each end of both Shafts. The Cutter Cams are mounted on the Cam Shaft that extends outside the Cam Case. The Cams and the Cutter Cam Lever Rollers must be oiled through the sight holes in the Cam Guard. All Cam Levers and the Belt Tightener Arm must be oiled at their points of fulcrum.

The Mold itself, including the Mold Closure is to be oiled with Monotype Rule Mold Oil. An Oil Cup is provided for this purpose and the feed should be regulated to suit the material cast. The amount of oil required depends not only on the product being cast, but also on the grade of type metal being used, the heat of the metal, the amount of cooling water, the speed of casting, etc. The following figures may be taken as an average but must be varied to suit local conditions:

Casting Fusion Material

Material Being Cast	Stroke	Amount of Oil Required
2 point	6 pica	1 drop each 16-20 casts
2 point	8 pica	1 drop each 12-15 casts
6 point	6 pica	1 drop each 12-14 casts
6 point	8 pica	1 drop each 10-12 casts
12 point	6 pica	1 drop each 10-12 casts
12 point	8 pica	1 drop each 8-10 casts

Casting Non-fusion Column-width Material

Material Being Cast	Stroke	Amount of Oil Required
2 point	12 picas	1 drop to 15 casts
6 point	12 picas	1 drop to 12 casts
12 point	12 picas	1 drop to 10 casts
Longer lengths up to	15 picas	More oil may be required

Be sure there is always oil showing in the oil cavity in the upper left end of the Mold From this cavity the oil feeds to the Mold Blade and Mold Closure. This is always sufficient to give ample lubrication to the Mold except when first starting up with the Mold cold, at which time a little Rule Mold Oil should be squirted on the Mold Blade and Mold Closure with the small oil can which is kept filled with Rule Mold Oil. The Mold Closure, although oiled from the same source, may occasionally require a drop of oil from the oil can.

Pump: There are two Gag Plates 6 (Fig. 7) which are used to advance the timing of the Piston stroke in relation to the closing of the Mold by the Mold Closure. Whether one or both of these Gag Plates or neither of them are used depends on the product. Usually the product should first be tried without any Gag Plates and then, if it shows hollow or the body not completely filled, try one or both Gag Plates until the proper relation is found for that product.

The Pump Latch 16 on Fig. 7 is to be swung down into operating position at all times.

If the Micrometer Stand carrying the Micrometer Wedges 9 and 10 (Fig. 17) is taken off the machine for any reason, be very careful not to reverse it when it is replaced. While the Stand will go on in the reverse position it will not function properly.

The shifting of the Belt is done by means of the screw driver with a long slim blade which is inserted through one of the holes in the front of the Belt Guard. This makes a simple and easy belt shifter.

Changing Molds: When changing Molds be sure to check the Matrix Carrier Toggle Link Adjustment. There is but one standard Blank Matrix for 1 to 12 point inclusive, therefore when changing height of slugs the Toggle Link Adjustment must be remade, and also when changing from .030" to .065" depth of drive Matrix.

Mold Holder Bolts: Do not tighten Bolts 4, 6, 10, 10, 22 and 28 (Fig. 23) too hard. They should be brought up to a good solid bearing, but do not use force to tighten them. It is possible to tighten the Bolts so hard that the Mold Blade may tend to hang up. The No. 83 Wrench should always be used to tighten all Bolts and Screws. The Speed Wrench used on these Bolts is for the purpose of quickly removing and replacing these Bolts and Screws when changing Molds, but not for their final tightening for which use the Small Wrench No. 83, as the Speed Wrench has too much leverage and will tend to strip the threads.

Starting after Mold change: When starting casting after any Mold change, it is usually desirable to put on a blank Matrix, get the length and position of the stroke correct and the Mold warmed up to running temperature, then change to the Matrix for the product desired.

Mold Blade Hanging Up: Please refer to the section on "Care of Mold" for contributing causes of Mold Blade hang-up. Check all possible conditions for the cause before removing the Mold for cleaning.

When casting non-fused material, if the product comes out different length or position than the stroke for which the Mold Blade is set, so that the Stacker does not shear it at the joint, check the following which may be the cause of this condition:

Make sure the Mold Blade Spring Box has some compression on each end of its stroke. It does not have to be much but if there is no compression on one or both ends of the stroke, it may cause variation in the length of stroke and in the product.

On material where the Matrix is not raised, the Mold Blade may create a vacuum on its return stroke, causing the last cast to follow back a trifle, so that the next cast will be short. This may repeat regularly or may occur only at intervals. The remedy is to adjust the Nuts 9 and 11 (Fig. 21) on the front end of the Toggle Link Operating Rod 10 so that the Matrix will be raised a slight amount to break the vacuum.

If the Friction Screw 35 (Fig. 23) is too loose it may permit the product to jump forward under the pressure of the Piston stroke or to be sucked back by the return stroke of the Mold Blade (see preceding paragraph).

If the Clamping Screw 35 (Fig. 23) is too tight it may cause the Mold Blade to hang up and not be able to push the product the full length of its stroke. This is usually accompanied by a snapping of the parts at times when the Spring Box loads up and suddenly lets go. At such times the product may be shot forward too far and give a long cast or a "squirt."

A Mold too hot so that the product will not cool and free itself sufficiently to permit the Blade to push it out, may cause hang-up of the Blade and irregular product the same as described in the preceding paragraph.

Insufficient oil may also cause the Mold Blade to hang up. This of course is remedied by giving the Blade more oil. Give an extra squirt of Rule Mold Oil from the hand oil can occasionally until the regular lubrication is sufficient to take care of this.

Improper oil will cause the Mold to hang up. Use only "Monotype Rule Mold Oil" on these Molds. The use of any other oil will not only cause trouble in casting, but it is detrimental to the Molds themselves.

Speed caution: Do not expect to start a new machine or a new or repaired Mold on the speeds given in the Table of Speeds (page 18). Run slower until the parts are worked in and satisfactory product is obtained. Then the speed can be gradually increased until the desired speed is obtained.

Cleaning closure of freeze-up: If the Mold Closure stays forward instead of closing, it is usually because of a little button of cold metal collected behind it. To clear this out or to free a frozen Nozzle proceed as follows:

Lower the Melting Pot one turn of the Handle below casting position. Have the machine running, watch the Mold Closure 16 (Fig. 21) and throw in the Pump Handle 24 (Fig. 19) long enough to give one stroke of the Pump. Note whether the Mold Closure 16 (Fig. 21) closed, indicating that the button of metal behind it has been melted out. If not, give it another stroke of the Pump. Seldom more than two strokes of the Pump are necessary to clear it. Then run the Pot down and (using the bronze Cleaning Rod) clear away all squirted metal around the Nozzle Seat.

Spitting at the Nozzle: The high pressure and sudden cutting off of the flow of metal by the Mold Closure tends to cause a little spitting at the Nozzle. Centering of the Nozzle will usually take care of this. If a little spitting persists, it will do no harm if it does not interfere with the quality of the product. If the spitting does interfere with the quality, and if the product still continues to come poor after all squirted metal has been cleaned from around the Nozzle seat, this indicates the Nozzle has not been properly adjusted (see "Nozzle Adjustments.")

Dross: Do not let the dross in the Metal Pot pile up too high or it will tend to heat the base of the Mold Holder and cause trouble with the Mold Closure, resulting in poor product.

Small point sizes: If difficulty is experienced getting good product or fusion on small point sizes, cut down the quantity of water through the Bolster Blocks and keep on casting until the Mold is heated up. On small point sizes it may also be necessary to raise the temperature of the type metal. Good product on small point sizes depends on getting the right combination of mold and metal temperatures and speed of casting. The position and amount of Closure opening and the number of Gag Plates used also affect the product.

Fusion: Failure to fuse is usually a question of the temperature of the Mold, although type metal not hot enough or not cast fast enough will have much the same effect. If the Mold is too cold the product will be of poor quality and the fusion not perfect. The water passages through the Bolster Blocks are large and permit such an abundant flow of water that the tendency is to get too much, especially during the winter months when the water itself is very cold. Of course it is essential that the right hand position of the Mold Blade be at the proper place for a perfect weld (see "Casting length of stroke. ")

Molds for 1 point: These Molds are of the fusion style, having the Mold Blade curved on the casting end, and are for leads only.

Greater care is required in casting 1 point than for the larger point sizes. When using Monotype grade of type metal a temperature of about 775° will probably be found about right. Plenty of Piston Spring pressure must be used. The water should be cut down to the very minimum. The fastest speed, a stroke of 6 picas, and the 14H58 Nozzle usually give the best results.

When running any other grade of type metal the above instructions must be modified to suit. The speed or stroke or metal temperature may have to be modified. Not much success will be made with inferior or dirty metal under any conditions.

The 1 point material is so thin that it is best to cast it in full length strips and cut it to labor-saving lengths on a saw.

Molds for 1 1/2 to 3 point: These Molds are made in two styles, one for non-fusion and the other for fusion material. The non-fusion Mold is equipped with a straight-end Mold Blade the same as larger point size Molds used for both classes of product. Therefore the non-fusion straight-end blade Mold is symboled NR the same as other regular Molds. The fusion Molds are equipped with a Mold Blade that is curved on the casting end to give better fusion. This Mold carries the symbol NR2F.

Borders: There is nothing difficult about casting fancy design borders if a few simple rules are followed:

a) Always use the second hole counting from the left in the Bell Crank 1 (Fig. 18) as specified in the Table accompanying Fig. 18. Standard Border Matrices are made for a Mold Blade stroke of 6 picas, and it is absolutely necessary that this length of stroke be used.

b) Use the Mold Blade Gage 1 (Fig. 29) for setting the Mold Blade stroke so that it will coincide with the beginning of the border at the left, and approximate as closely as possible the exact stroke of 6 picas desired. This setting is to be made when assembling the Mold before the front Matrix Guide is put on and has already been described. All standard fancy border Matrices have the design positioned the same distance from the left end of the Matrix, which calls for positioning the Mold Blade stroke as described.

c) A few difficult-to-cast borders, such as Ben Day and lithotones are made for 4 pica stroke and the settings must be altered accordingly.

d) The exact Micrometer Adjustment for the length of stroke must be made from an examination of the product under a glass after a few casts have been made. (See Decorative Borders, page 26.) This adjustment must be again checked by an examination of the product after the casting has proceeded long enough so that all parts are heated and operating under normal running conditions. This adjustment should be checked from time to time during the run to be sure it has not changed due to changing conditions of running. The fancy border Matrices are made so that there is a repeating part of the design at the right end of the drive which will overlap the left end of the previous cast and thus seal the Mold for the next cast. This overlapping portion must seat so as to match exactly the design on the end of the previous cast. An examination of this joint in the face, by means of an eye glass, will reveal the position of the Matrix seating on the end of the previous cast relative to the design - that is, whether it is positioned correctly or is too far to the right or left. A little experience will enable the operator to readily detect in which direction the right end of the stroke should be moved to make the design match exactly. (See "Decorative Borders," page 26.)

e) Either the 14H58 single-hole offset Nozzle or the three-hole Nozzle usually gives the best results on fancy borders.

Flush Side Mold, Style NRB: These Molds have the Type Blocks more than type high. A special style of male Matrix must be used. The part of this Matrix which goes down between the Type Blocks is the point size of the mold

so that it just fits between the Type Blocks and it carries on its lower edge the face to be cast. Depending on the Matrix used, the product from this Mold is cast flush to one side or both sides without any trimming.

Trimmer Molds, Style NR2G: These Molds have a long right Point Block which projects beyond the Mold. On each side of the extended Point Block is mounted a Trimmer which trims off anything hanging over either side of the body from shoulder to face.

Any face can be made flush to the side on the Mold by moving the Matrix Guides toward the rear by the amount of the bevel on the drive of the Matrix. The face is then cast with the bevel overhanging and is trimmed off by the rear Trimmer, leaving the face flush to the side.

To cast full face flush-to-both-sides material, select a full face Matrix of the next larger point size than the body desired, move the Matrix Guides back half a point (half the difference between the point size of the Matrix and the point size of the Mold) and the Trimmers will trim the overhanging bevel from both sides, leaving the product full face, flush to both sides. For example, on a 6 point NR2G Mold, use a 7 point full face Matrix with Matrix Guides moved back half a point to obtain rule flush to both sides.

EXPLANATION OF MATRIX SYMBOLS

The following explains and illustrates the principal symbols used in designating Material Making Machine Matrices.

Straight Line Rules

(1) First Symbol indicates Minimum Size of Body -
The first symbol is in figures, and indicates the smallest body size on which the rule face can be cast. A Matrix that can be cast on a 2-point body will be symboled for a 2-point body, even if it is ordered for a body of larger size. This is because Matrices for the Material Making Machine may be cast on any body size larger than the one for which they are symboled.

(2) Second Symbol indicates Use of Matrices -
The second symbol is the letter "M" and is never changed. It indicates that the Matrix is made for use on the Monotype Material Making Machine and that it can be used on no other Machine.

(3) Third Symbol indicates Design -
Each rule face in our Specimen Book for use on any Monotype Machine has a design symbol. For instance, a hairline on the side of the body is

symboled "11." These same symbols are used in marking rule Matrices for the Material Making Machine.

(4) Fourth Symbol indicates Classification -
The fourth symbol is the letter "L," and indicates the Matrix is for casting straight line rules.

(5) Fifth Symbol indicates Length of Fusion Cast -
This symbol indicates the proper length of fusion cast (Mold Blade stroke) in nonpareils and is always "12" except for a few difficult borders which are made 8 nonpareils stroke. Matrices for non-fusion, or single casts, omit this symbol because with them the length of cast can be varied to suit requirements.

Example: 2M11L12 - This Symbol indicates that (2) the smallest point size on which the Matrix can be cast is 2-point; that (M) it is for the Material Making Machine; that (11) the design is a hairline on the side of the body; that (L) it belongs to the classification of straight-line rules; and that (12) the length of fusion cast is 12 nonpareils.

Decorative Borders

(1) First Symbol indicates Minimum Size of Body -
Same as in "Straight Line Rules," above.

(2) Second Symbol indicates Use of Matrices -
Same as in "Straight-line Rules," above.

(3) Third Symbol indicates Design -
Same as in "Straight-line Rules," above; except that different numbers are assigned to decorative borders.

(4) Fourth Symbol indicates Classification -
The fourth symbol is the letter "N," indicating that the Matrix is to be used for casting decorative borders in strips.

Example: 6M594N - This symbol indicates that (6) the smallest point-size on which the border can be cast is 6 point; that (M) it is for the Monotype Material Making Machine; that (594) it is design No. 594, shown in our Specimen Book; and that (N) it belongs to the classification of decorative borders.

Single Column Dashes

(1) First Symbol indicates Minimum Size of Body -
Same as in the "Straight Line Rules" as above. Exception: A few dashes

have the face near the side of the body. In such cases the first symbol consists of two numbers divided by a hyphen, as 2-6. The first number indicates the width of body on which the face would center if it could be cast on that width body; but because of wide bevel on one side to support the face the dash must be cast on a wider body (in this case a minimum of 6 points with the face 1 point from the side).

(2) Second Symbol indicates Use of Matrix -
Same as in "Straight Line Rules," above.

(3) Third Symbol indicates Design -
Same as in "Straight Line Rules," as above; except that different numbers are assigned to single column dashes.

(4) Fourth Symbol indicates Classification -
In this case the symbol is always the letter "Z," and indicates that the Matrix is for single-column dash whose face is shorter than its body. (In casting single-column full-length dashes, or "cut-off rules," Matrices having a short Head Bearing are used with the non-fusion method of casting.

(5) Fifth Symbol indicates Length of Face of Dash -
This symbol indicates the length of the face of the dash in nonpareils. Thus, the symbol "12," would indicate that the face of the dash is to be 6 picas long. Length of the body of the dash is not indicated in the symboling, since the length may be varied, to a certain extent. Table shown on page 56 gives the longest and shortest body on which a dash of any given length face can be cast central from a Matrix of this style. If cast off center, the maximum there shown cannot be obtained but the minimum still obtains. To get shorter length body than shown in the Table requires a Matrix with a clearance cut in the right end. This at the same time reduces the maximum length obtainable. Therefore, when ordering a Cut-off Dash Matrix be sure to specify the length of body wanted as well as the face.

(6) Sixth Symbol indicates Side Dash -
This symbol is used only where the face of the dash is to be cast flush to the end (lengthwise) of the body. It is the letter "a," and is invariable whenever used.

(7) Seventh Symbol indicates Length of Body of Dash -
Where the sixth symbol (above) is omitted, this seventh symbol also is omitted. Where the sixth symbol is used (indicating that the face on the dash is to be cast flush to the end of the body) this seventh symbol indicates in figures the nonpareil length of the body of the dash. A separate Matrix is required for each body length.

TABLE OF CUT-OFF DASHES

Length of Face in Picas	Maximum Length of Body in Picas	Minimum Length of Body in Picas
2*	15	9 1/2
3*	15	10
4*	15	10 1/2
5*	15	11
6*	15	11 1/2
7*	15	12
8*	15	12 1/2

*Double this for nonpareil marking on Matrix.
The examples used as illustrations in this Table are chosen as being typical but the numerals in the Matrix symbols will vary according to point size, design of face, and length of stroke.

Example: 6M1Z14a - The first figure indicates that (6) the face is to be centered on a 6-point body, and also that it can be cast on a 6-point body, that (M) it is for the Material Making Machine; that (1) it is a hairline; that (Z) it is a single-column dash whose face is shorter than the body on which it is to center lengthwise; that (14) the face is to be 14 nonpareils long and that (a) the face is to be cast flush (lengthwise) to one end of the body.

Example: 2-6M1Z10 - The first figure indicates that (2) the Matrix would be centered on a 2-point body (if it could be so cast) but that (6) it cannot be cast on any body smaller than 6 point and it will, of course be off center on that body; that (M) it is for the Monotype Material Making Machine, that (1) it is a hairline rule; that (Z) it is a single-column dash with a face shorter than its body; and that (10) the face is 10 nonpareils long. This Matrix, like all Matrices for the Monotype Material Making Machine, can be cast on any body larger than its minimum size (6 point), and if cast on a larger body the face will remain the same distance from the side of the body as on its minimum body.

Figure numbers
referred to in text

Figure 1

Part No.	Symbol	Name
1	15H1	Squaring Pin
2	Xa23H20	Pump Body
3	a23H35	Plug

Figure 2

Part No.	Symbol	Name
1	a26H6H	Lifting Lever (nozzle end)
2	a26H7	Fulcaum Pin
3	c14H10	Nozzle (see Fig. 27)
4	b252E1	Base Plate
5	a12H27	Melting Pot (gas)
6	a12H28	Pot Casing
7	a12H32	Adj. Lug (left)
8	a37H19	Aoj. Screw (2)
9	a37H18	Table
10	a23H26	Nut (2)
11	a23H24	Stop Plate (upper)
12	a23H23	Stop Plate (lower)
13	a23H27	Sleeve (2)
14	Xa23H20	Pump Body
15	a25H11	Pin
16	a25H10	Fulcrum Pin
17	a25H8	Lifting Lever (piston end)
18	a25H9	Clamp Scaew
19	86H1	Adjusting Pin
20	a12H31	Adj. Lug (right)
21	a37H19	Adj. Screw (2)
22	a37H20	Stud
23	Xb55H34	Gas Burner
24	a12H38	Screw (3)
25	a12H39	Washer (3)
26	252E2	Nozzle Seat
27	c252E36	Guioe Plate (right)
28	b252E35	Guioe Plate (left)

Figure 3

Part No.	Symbol	Name
1	a28H12	Lock Nut
2	a28H11	Nut
3	29H	Lever
4	a37H11	Bushing
5	a28H13	Washer
6	a28H14	Nut
7	a28H15	Lock Nut
8	a28H10	Nut
9	a28H9	Washer
10	b37H	Swing Frame
11	a28H8	Extension
12	29H1	Pin
13	29H3	Stand
14	a28H7	Roo
15	a26H6H	Lifting Lever (nozzle end)

Figure 4

Part No.	Symbol	Name
1	31H10	Nut (upper)
2	31H2	Crosshead
3	a31H11	Sleeve (3)
4	31H1	Roo
5	a31H11	Sleeve (3)
6	a31H15	Abutment (2)
7	a31H14	Spring
8	a31H15	Abutment (2)
9	a31H11	Sleeve (3)
10	c218E1	Main Stand
11	31H13	Nut (2)
12	31H13	Nut (2)
13	19H4	Nut
14	a19H3	Crosshead (upper)
15	c218E1	Main Stand
16	a19H	Operating Rod
17	68H1	Connecting Rod
18	68H12	Lock Nut
19	68H11	Eye (rear)
20	68H13	Pin
21	a67H1	Bell Crank
22	69H1	Shaft
23	19H2	Dowel
24	a19H8	Crosshead (lower)

Figure 5

Part No.	Symbol	Name
1	a20H11	Rod
2	a20H9	Spring (outside)
3	13H	Chimney
4	62H2H	Shaft
5	62H5	Lock Nut
6	62H4	Nut
7	62H1	Latch Stand
8	a62H8	Spring
9	58H1	Latch Abutment
10	59H1	Spring
11	a28H7	Operating Rod
12	a28H12	Lock Nut
13	a28H11	Nut
14	29H	Lever
15	29H3	Stand
16	a31H11	Sleeve (3)
17	a31H15	Abutment (2)
18	31H14	Spring
19	b37H	Swing Frame
20	a31H15	Abutment (2)
21	a31H11	Sleeve (3)
22	a67H1	Bell Crank
23	a19H8	Crosshead (lower)
24	31H1	Roo
25	31H13	Stop Nut (2)
26	31H13	Stop Nut (2)
27	68H1	Connecting Rod
28	68H12	Lock Nut
29	68H11	Eye (rear)
30	68H13	Eye Pin
31	68H14	Cottea (2)
32	69H1	Shaft
33	68H10	Lock Nut
34	247E2	Pin
35	68H9	Spring Clip
36	68H3H	Gag Block
37	a68H4	Fulcrum Pin
38	68H6H	Handle
39	68H2	Eye (front)
40	247E1E	Pump Cam Lever
41	a235E1	Fulcrum Pin
42	57H1	Latch
43	31H8	Stop
44	19H4	Nut
45	a19H3	Crosshead (upper)
46	c218E1	Main Stand
47	31H2	Crosshead
48	31H9	Nut
49	a19H	Operating Rod
50	a20H7	Spring (inside)

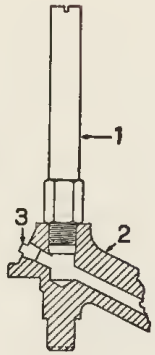


FIGURE 1
SQUARING PIN in NOZZLE End of PUMP

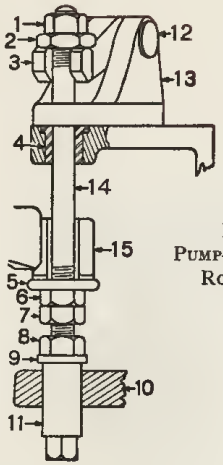


FIGURE 3
PUMP-BODY OPERATING ROD Mechanism

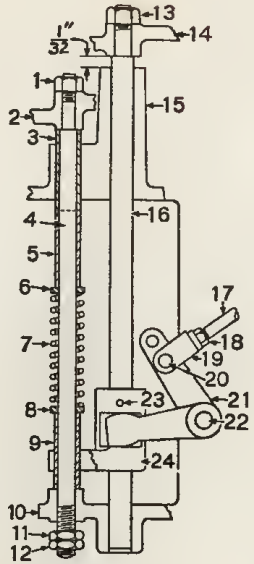


FIGURE 4
PUMP-BODY-SPRING ROD, PISTON OPERATING ROD, and PUMP BELL CRANK Mechanism

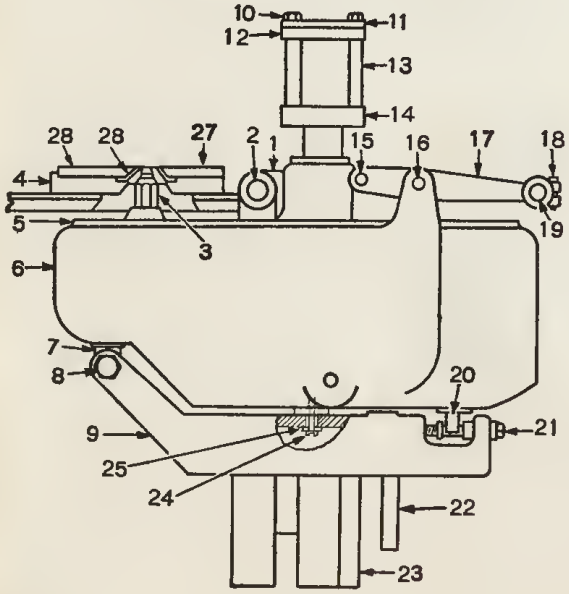


FIGURE 2
MELTING POT with SWING FRAME, PUMP, LEVERS and BURNERS

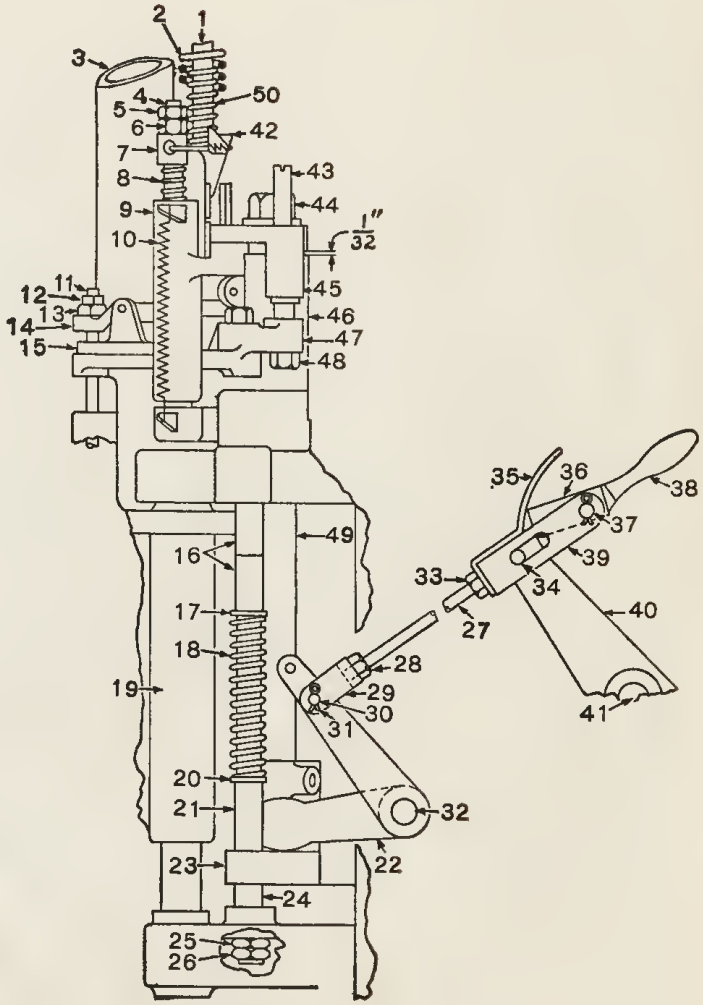


FIGURE 5
Mechanism for Operating, Adjusting, and Controlling the PUMP

Figure 6

Part No.	Symbol	Name
1	a17H13	Piston
2	a23H26	Nut (2)
3	a23H24	Stop Plate (upper)
4	a23H23	Stop Plate (lower)
5	a23H25	Stud (2)
6	32H1	Pin
7	a18H	Piston Lever
8	32H3	Plunger
9	32H4	Spring
10	32H	Link
11	31H8	Stop
12	a19H3	Crosshead (upper)
13	31H10	Nut (upper)
14	31H2	Crosshead
15	31H5	Pin
16	31H1	Rod
17	a24H	Lever

Figure 7

Part No.	Symbol	Name
1	a20H11	Rod
2	a20H7	Spring (inside)
3	a20H9	Spring (outside)
4	a20H10	Abutment
5	a81H2	Stud
6	a81H1	Gag Plate (2)
7	a19H5	Stud
8	a19H7	Lock Nut
9	a19H3	Crosshead (upper)
10	58H1	Abutment
11	31H4	Nut
12	62H2H	Shaft
13	62H5	Lock Nut
14	62H4	Nut
15	62H1	Latch Stand
16	57H1	Latch
17	a62H8	Spring
18	a57H4	Latch Plate
19	58H2	Abutment Plate
20	58H3	Screw
21	59H1	Spring
22	a20H2	Rod Eye
23	a31H3	Crosshead Eye

Figure 8

Part No.	Symbol	Name
1	a19H	Rod
2	19H4	Nut
3	31H8	Stop
4	a19H3	Crosshead (upper)
5	a19H5	Stud
6	a19H7	Lock Nut
7	29H	Lever

Figure 9

Part No.	Symbol	Name
1	a18H	Piston Lever
2	29H	Lever
3	29H1	Pin
4	a28H7	Rod
5	a28H12	Lock Nut
6	a28H11	Nut
7	29H3	Stand

Figure 10

Part No.	Symbol	Name
1	c14H10	Nozzle (See Fig. 27)
2	a14H12	Lock Nut
3	a23H31	Plug
4	a17H13	Piston
5	Xa23H20	Pump Body
6	a23H21	Bushing
7	a23H31	Valve Plug (side)
8	a23H28	Plug (bottom)
9	a23H34	Nut
10	a23H33	Regulating Screw
11	a23H32	Valve Seat
12	a23H29	Valve
13	a23H30	Valve Plug (bottom)

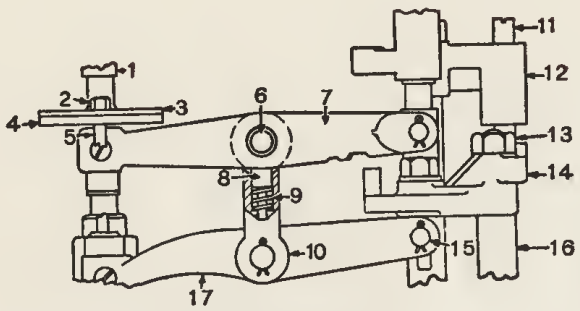


FIGURE 6
PUMP-BODY LEVERS and PISTON LEVERS

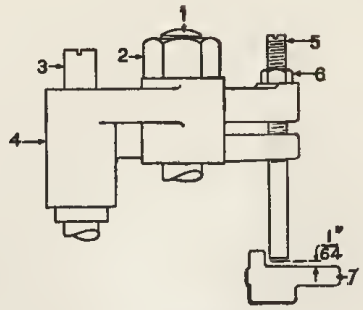


FIGURE 8
CROSS-HEAD STUD and PUMP OPERATING LEVER

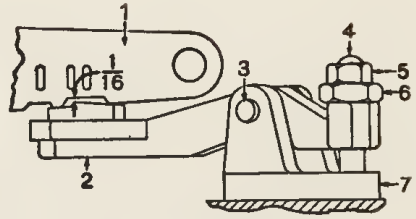


FIGURE 9
PISTON LEVER and PUMP OPERATING LEVER

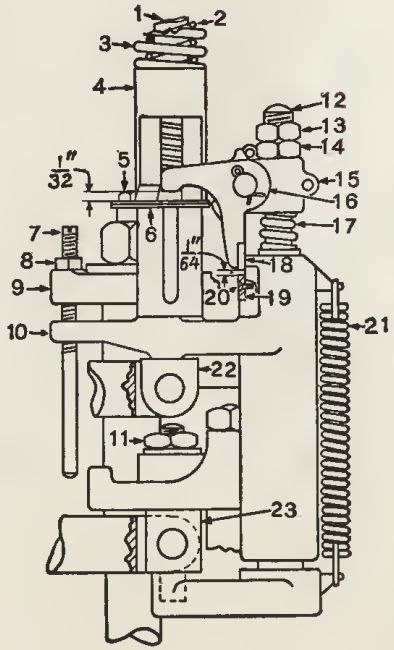


FIGURE 7
PUMP LATCH and GAG PLATES

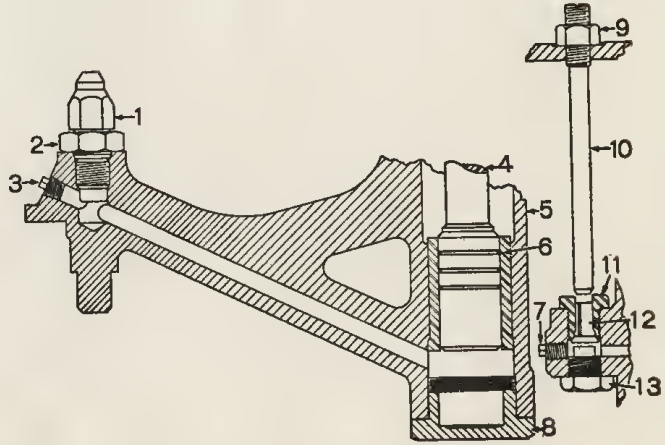


FIGURE 10
PUMP BODY, with PISTON, NOZZLE, INTAKE VALVE, and PORT REGULATING SCREW

Figure 11

Part No.	Symbol	Name
1	176F1	Guard (left)
2	a97F9	Screw (2)
3	a97F8	Spring Clip
4	177F1	Guide Plate
5	177F2	Collar
6	29L1	Covers
7	a207E16	Pawl Finger
8	179F1	Stop
9	178F4	Handle
10	178F2	Bracket
11	178F6	Facing
12	178F1	Roller
13	178F3	Shaft
14	176F2	Guard (right)

Figure 12

Part No.	Symbol	Name
1	162F1F	Bracket
2	93F1	Supporting Beam
3	93F2	Bolts (2)
4	176F1	Guard (left)
5	95F2	Bolts (2)
6	a84F2	Shear Blade Guide
7	85F2	Screw (4)
8	a85F5F	Tube
9	97F7	Screw (4)
10	96F2F	Hanger (left) (rear)
11	97F4F	Hanger (left) (front)
12	85F4	Dowel
13	a83F3	Shear Blade
14	a85F1	Shoe

Figure 13

Part No.	Symbol	Name
1	93F2	Bolt (2)
2	93F1	Support Beam
3	100F1	Rod
4	97F4F	Hanger (front) (left)
5	a101F6	Bearing
6	a101F1F	Operating Lever
7	b96F1F	Transfer Bar (rear)
8	b97F1	Transfer Bar (front)
9	85F1	Blade Shoe
10	b91F2	Rock Shaft
11	a91F5	Link Pin (2)
12	a91F4	Link (2)
13	162F1F	Main Bracket
14	102F1	Adj. Screw
15	102F2	Adj. Screw Nut
16	170F2	Fulcrum Pin
17	a207E3	Pawl Finger
18	207E8	Spring Post
19	a207E2E	Pawl
20	207E5	Fulcrum Pin
21	207E7	Spring
22	a151F3	Adj. Screw
23	a151F4	Lock Nut
24	162F3	Spring Pin
25	171F2	Plate (2)
26	171F1	Spring
27	207E13	Spring Pin
28	154F1	Screw (2)
29	207E1E	Cam Lever
30	a170F1F	Shear Yoke
31	167F1	Pin
32	a101F2	Extension
33	a101F5	Nut
34	a101F4	Adj. Screw
35	151F2	Stop Pin
36	170F4	Spring Pin

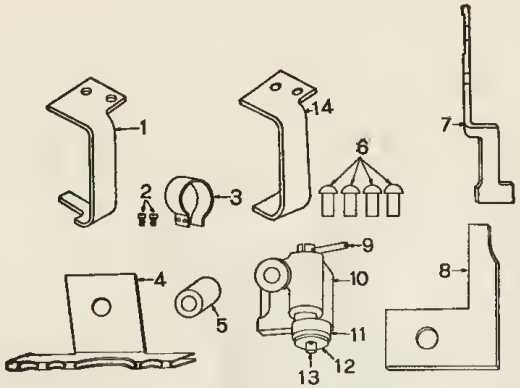


FIGURE 11
Miscellaneous Parts of AUTOMATIC CUTTER

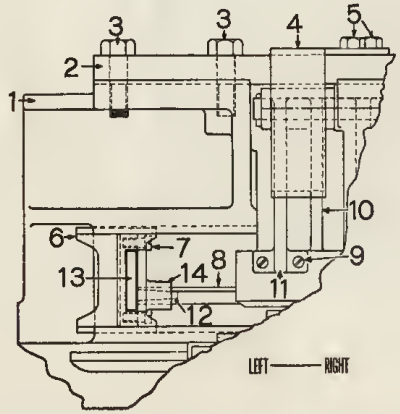


FIGURE 12
Left End of AUTOMATIC CUTTER Showing SHEAR Parts

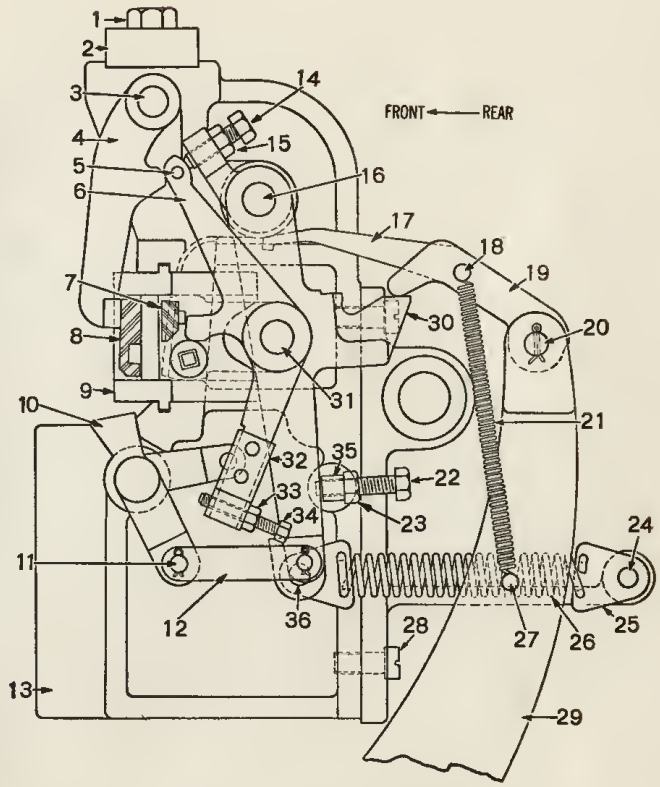


FIGURE 13
AUTOMATIC CUTTER—Looking from Right End

Figure 14

Part No.	Symbol	Name
1	94F2	Bolt (2)
2	93F1	Supporting Beam
3	100F1	Hanger Rod
4	94F1F	Bracket (right)
5	96F4	Hanger (rear) (right)
6	97F6	Hanger (front) (right)
7	96F5	Screw (4)
8	b96F1F	Bar (rear)
9	a77F3	Bar Support
10	a77F4	Screw
11	b91F2	Rock Shaft
12	168F3	Spring Hook
13	168F1	Spring
14	a86F3	Clamp (lower)
15	a88F5	Adj. Nut
16	175F1	Friction Plate
17	175F2	Screw
18	a85F6	Spring Post
19	168F2	Plate (2)
20	88F1F	Shear Gage
21	88F2	Lug
22	88F4	Lug Pin
23	a86F1	Clamp (upper)
24	88F3	Lug Latch
25	a89F1	Spring
26	86F2	Clamp Screw
27	a85F5F	Shoe Tube

Figure 15

Part No.	Symbol	Name
1	94F2	Bolt (2)
2	93F1	Supporting Beam
3	100F1	Hanger Rod
4	97F6	Hanger (right) (front)
5	96F4	Hanger (right) (rear)
6	94F1F	Bracket (right)
7	96F5	Screw (4)
8	87F1	Guide
9	87F2	Screw (2)
10	a77F1	Channel Bar
11	b91F2	Rock Shaft
12	77F2	Screw
13	176F2	Guard (right)

Figure 16

Part No.	Symbol	Name
1	157F1F	Rock Shaft
2	158F1	Spring
3	159F1	Screw (2)
4	157F4	Tooth
5	156F15F	Carrier
6	156F6	Bolt (2)
7	156F7	Washer (2)
8	156F4	Washer
9	156F3	Nut
10	156F10	Washer
11	156F9	Screw
12	156F1F	Brackett
13	156F2	Bolt
14	156F14	Shear Blade
15	156F8	Guide
16	156F11	Shear Blade (fixed)
17	156F12	Adj. Screw
18	156F13	Screw
19	156F17	Stop Screw
20	172F3	Rivet
21	172E2	Spring
22	172F1F	Bar
23	172F8	Rivet (2)
24	a78F5	Galley Ledge
25	157F2	Shaft Arm
26	207E5	Fulcrum Pin
27	a207E3	Finger
28	207E1E	Lever
29	a207E2E	Pawl
30	157F3	Nut
31	a170F1F	Shear Yoke
32	170F2	Fulcrum Pin
33	102F1	Adj. Screw
34	102F2	Nut
35	93F2	Bolt (2)
36	93F1	Supporting Beam
37	95F1F	Bracket (left)
38	a160F1F	Galley Plate
39	173F2	Adj. Screw
40	173F3	Adj. Screw
41	173F4	Screw (4)
42	172F5	Clamp
43	172F6	Bolt
44	172F4	Support
45	173F1	Adj. Stand
46	207E8	Spring Post
47	a207E15	Spring
48	a207E4	Screw

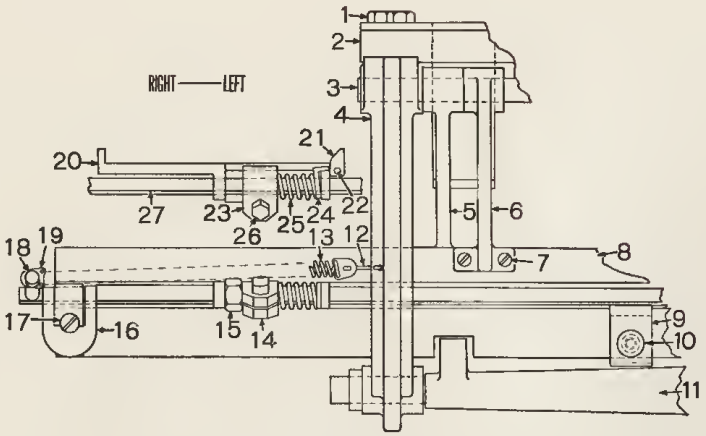


FIGURE 14
SHEAR GAGE for Setting Length of Cut
Rear View of Right End of CUTTER

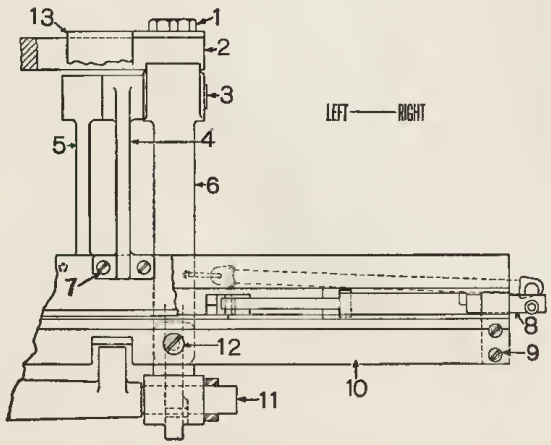


FIGURE 15
Right End of CUTTER—Front View

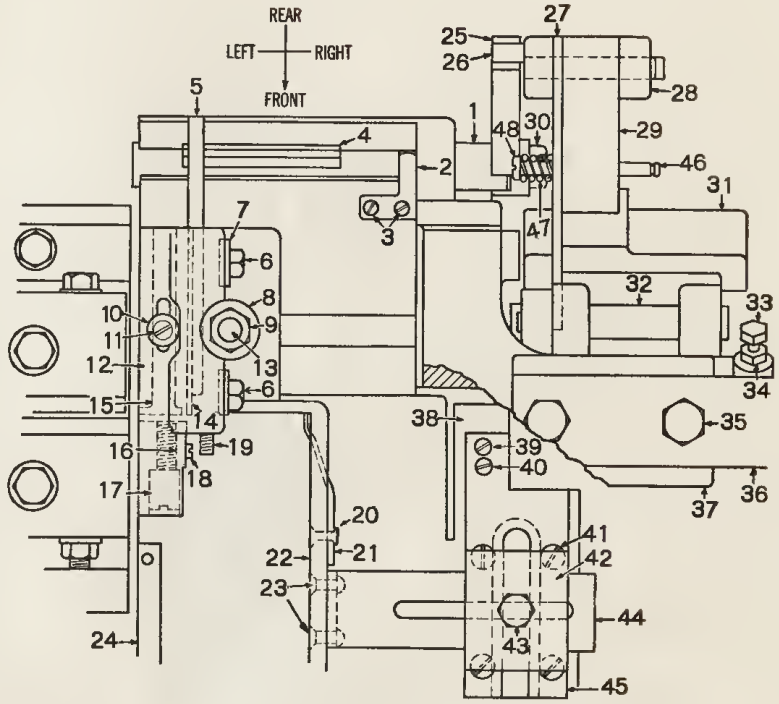


FIGURE 16
Non-fusion STACKER—Top View

Figure 17

Part No.	Symbol	Name
1	237E6	Rod Head
2	237E10	Adj. Screw Head
3	237E11	Lock Nut
4	237E9	Adj. Screw
5	a237E5	Rod
6	237E7	Lock Nut
7	237E3	Coupling Screw
8	237E2	Coupling
9	a237E4	Wedge (2)
10	a237E4	Wedge (2)
11	237E1	Rod
12	237E15	Stand (top)
13	237E9	Adj. Screw
14	237E11	Lock Nut
15	237E10	Head

Figure 18

Part No.	Symbol	Name
1	a230E1E	Bell Crank
2	230E2	Bushing

Figure 19

Part No.	Symbol	Name
1	a238E7	Screw
2	238E6	Cap
3	231E1	Adj. Stud
4	a230E1E	Bell Crank
5	a238E5E	Socket
6	238E8	Lock Nut
7	238E1E	Rod
8	238E3	Lock Nut
9	238E2	Adj. Nut
10	238E12	Abutment
11	238E14	Tube Cap
12	238E13	Tube
13	a218E4	Clamp
14	a218E6	Nut
15	238E15E	Socket
16	232E4	Washer
17	232E3	Nut
18	232E1	Stud
19	a74H2	Pipe (supply)
20	a74H4	Pipe (drain)
21	a74H3	Pipe (drain)
22	a74H1	Pipe (supply)
23	68H9	Spring Clip
24	68H6H	Handle
25	238E16	Cap
26	a238E7	Screw (2)
27	a235E1	Fulcrum Pin
28	234E3	Ball Pin

Figure 20

Part No.	Symbol	Name
1	a238E21	Lock Nut (2)
2	a238E20	Nut (2)
3	238E6	Cap
4	238E18	Ball
5	a238E7	Screw (2)
6	a238E5E	Socket (rear)
7	238E8	Nut
8	238E1E	Rod
9	238E3	Nut
10	238E2	Nut
11	238E12	Abutment
12	238E14	Cap
13	238E9	Spring
14	238E10	Spring
15	238E13	Tube
16	238E11	Abutment
17	238E4	Head
18	238E15E	Socket (front)
19	238E19	Ball
20	238E16	Cap
21	238E17	Screw

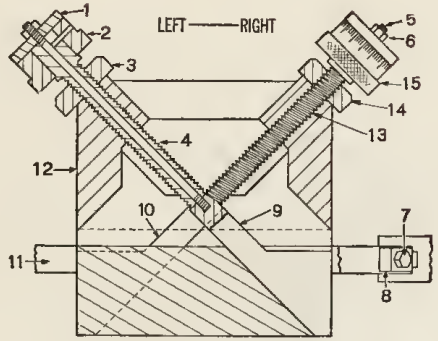
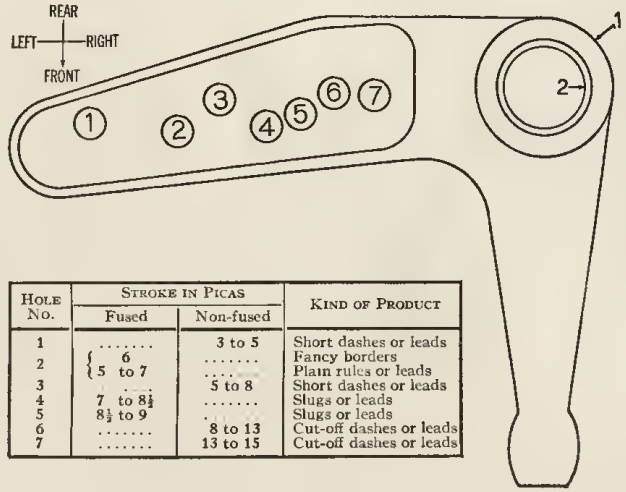


FIGURE 17
MICROMETER WEDGES



HOLE NO.	STROKE IN PICAS		KIND OF PRODUCT
	Fused	Non-fused	
1	.....	3 to 5	Short dashes or leads
2	6	.....	Fancy borders
	5 to 7	....	Plain rules or leads
3	.	5 to 8	Short dashes or leads
4	7 to 8½	.....	Slugs or leads
5	8½ to 9	.	Slugs or leads
6	.....	8 to 13	Cut-off dashes or leads
7	.....	13 to 15	Cut-off dashes or leads

FIGURE 18
MOLD-BLADE BELL CRANK

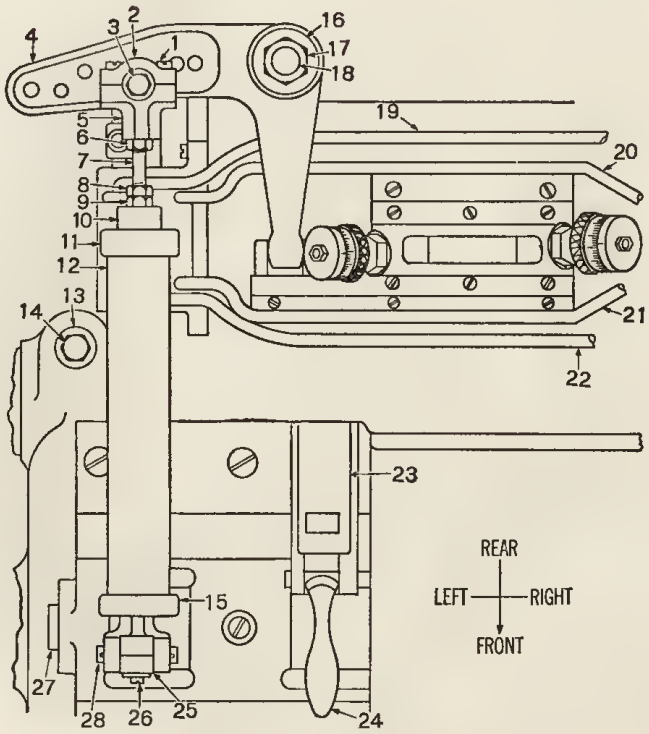


FIGURE 19
MOLD BLADE OPERATING AND SETTING MECHANISM AND PUMP CONTROL

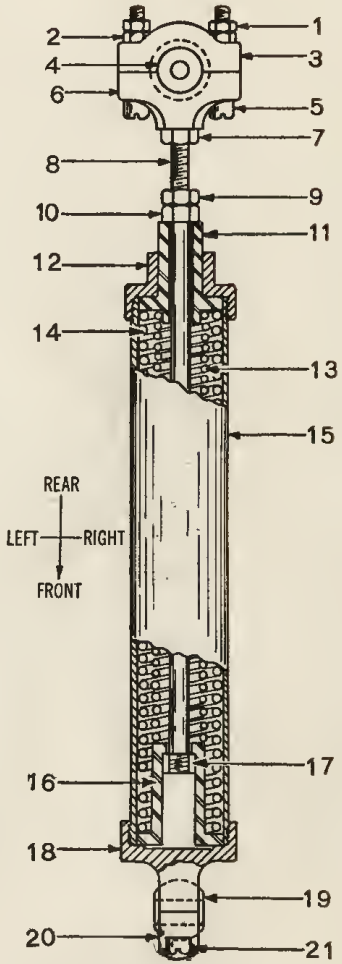


FIGURE 20
MOLD-BLADE SPRING BOX

Figure 21

Part No.	Symbol	Name
1	63A4	Rod Eye
2	63A5	Lock Nut
3	a63A14	Abutment
4	a63A13	Sleeve
5	a63A15	Sleeve (2)
6	a63A8	Spring
7	a63A14	Abutment (2)
8	63A3	Socket (rear)
9	63A6	Nut
10	63A1	Rod
11	63A7	Lock Nut
12	63A2	Socket (front)
13	63A11	Ball Extension
14	227E3	Clamp Screw
15	227E1E	Cam Lever
16	a252E34	Closure
17	241E2	Bracket
18	241E4	Spring
19	a241E3	Bracket Head
20	b241E6	Nut (graduated)
21	a241E7	Lock Nut
22	a241E1	Rod
23	a248E1	Tumbler
24	240E1	Cam Lever
25	242E1	Screw (4)
26	248E6E	Tumbler Latch
27	248E7	Fulcrum Pin
28	61A1	Rod
29	61A5	Lock Nut
30	61A3	Nut
31	60A1	Adj. Sleeve
32	60A2	Lock Nut
33	56A2	Nut (3)
34	55A1	Bridge
35	59A5	Link Pin
36	56A1	Bridge Support
37	a59A2A	Link (upper)
38	59A3	Pin (center)
39	a59A1	Link (lower)
40	58A1	Pin
41	a252E65	Wedge
42	252E39	Abutment
43	252E2	Nozzle Seat
44	252E53	Shield
45	a252E54	Screw (4)
46	.....	Matrix
47	57A1A	Matrix Carrier
48	a252E38	Stop Plate
49	63A10	Guard
50	59A6	Cotter
51	61A2	Eye

Figure 22

Part No.	Symbol	Name
1	a230E1E	Bell Crank
2	237E1	Rod
3	237E15	Stand (top)
4	237E13	Screw (5)
5	237E16	Screw (6)
6	237E14	Dowel (2)
7	237E2	Coupling
8	237E3	Screw
9	237E12	Stand (bottom)

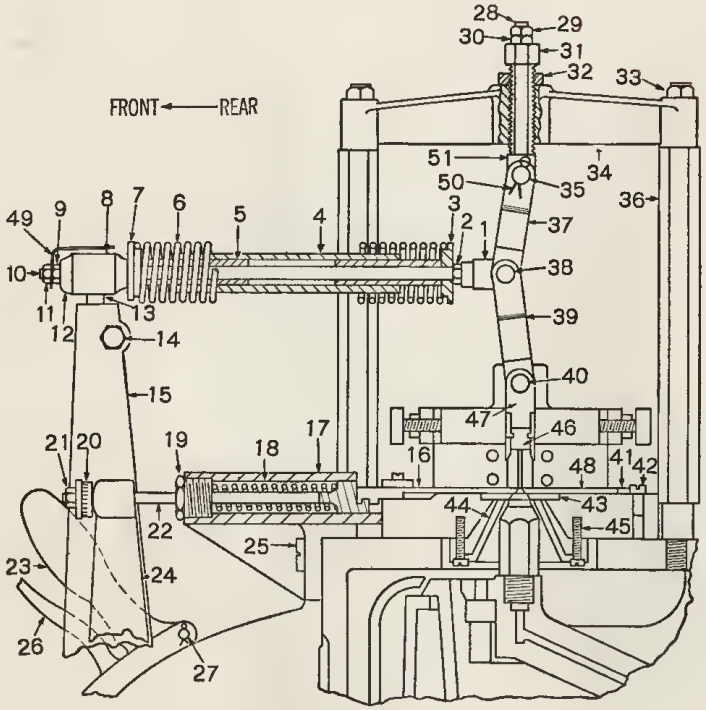


FIGURE 21
Cross Section Showing MATRIX Operating Mechanism, MOLD and CLOSURE Mechanism

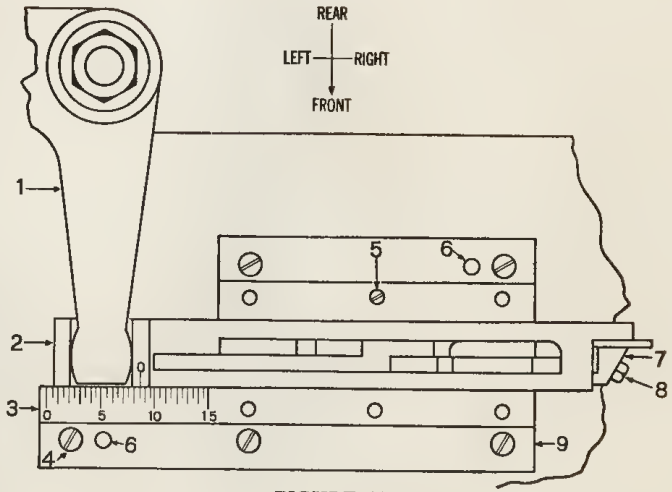


FIGURE 22
MOLD-BLADE OPERATING BAR and GAGE for Setting Stroke

Figure 23

Part No.	Sym-bol	Name
1	a252E25	Screw (4)
2	a252E24	Gage Plate
3	252E18E	Bolster (rear)
4	252E42	Bolt (short) (2)
5	252E48	Thrust Bar (2)
6	252E45	Bolt (long) (2)
7	252E31	Guide (rear)
8	252E50	Lock Nut (2)
9	252E49	Adj. Screw
10	252E29	Screw (4)
11	252E59	Elbow Nut (4)
12	252E13E	Elbow
13	.....	Mold Blade
14	237E2	Coupling
15	237E3	Screw
16	252E17	Washer (4)
17	252E44	Washer (4)
18	252E43	Nut (2)
19	252E42	Bolt (short) (2)
20	b252E35E	Guide Plate
21	252E47	Washer (4)
22	252E45	Bolt (long) (2)
23	252E48	Thrust Bar (2)
24	252E40	Closure Shoe
25	a252E34	Closure
26	252E41	Screw (2)
27	252E28	Guide (front)
28	252E16	Screw (4)
29	252E46	Nut (2)
30	c252E36	Guide Plate
31	252E14	Plug Screw
32	.....	Mold
33	252E15	Plug Screw
34	252E8E	Bolster (front)
35	252E11	Clamping Screw
36	a252E62	Abutment (2)
37	a252E63	Screw (4)
38	b252E1E	Base Plate
39	252E59	Elbow Nut
40	.....	Point Block (left)
41	.....	Point Block (right)
42	252E59	Elbow Nut
43	252E49	Adj. Screw
44	252E50	Lock Nut

Figure 24

Part No.	Sym-bol	Name
1	252E48	Thrust Bar (2)
2	252E18E	Bolster (rear)
3	252E49	Adj. Screw
4	a252E24	Gage Plate
5	252E19E	Bolster Elbow
6	252E39	Abutment
7	a252E65	Wedge
8	a252E38	Stop Plate
9	b252E35E	Guide Plate (left)
10	a252E57	Clamp Screw
11	b252E56	Clamp
12	a252E25	Screw
13	252E53	Shield
14	a252E54	Screw (4)
15	252E16	Screw (4)
16	252E42	Bolt (short) (2)
17	252E8E	Bolster (front)
18	252E15	Plug Screw
19	237E2	Coupling
20	b252E1E	Base Plate

Figure 25

Part No.	Sym-bol	Name
1	a20H11	Spring Rod
2	a20H9	Spring (outer)
3	13H	Chimney
4	31H8	Stop
5	59H1	Spring
6	19H3	Crosshead (upper)
7	58H1	Aeutment
8	29H	Lever
9	29H3	Stand
10	31H9	Stop Nut
11	a74H2	Pipe (supply)
12	a74H4	Pipe (drain)
13	a74H3	Pipe (drain)
14	R74H1	Pipe (supply)
15	74H5	Water Cock (2)
16	66H1	Bracket
17	66H7	Tee
18	a31H14	Spring
19	253E1	Pulley
20	209E4	Shaft Nut
21	209E1E	Shaft
22	a67H1	Bell Crank
23	a19H8	Crosshead (lower)
24	a39H	Rack
25	31H13	Stop Nut (2)
26	31H13	Stop Nut (2)
27	227E1E	Cam Lever
28	68H9	Spring Clip
29	a68H16	Pin
30	68H2	Rod Eye (front)
31	234E1E	Cam Lever
32	247E1E	Cam Lever
33	68H1	Rod
34	a235E1	Fulcrum Pin
35	202E1	Screw (8)
36	a201E1	Stand
37	b204E1	Cam Shaft
38	204E7	Key (long)
39	a234E5E	Roller
40	69H1	Shaft

Figure 26

Part No..	Sym-bol	Name
1	a255E1	Index Plate
2	255E2	Screw (2)

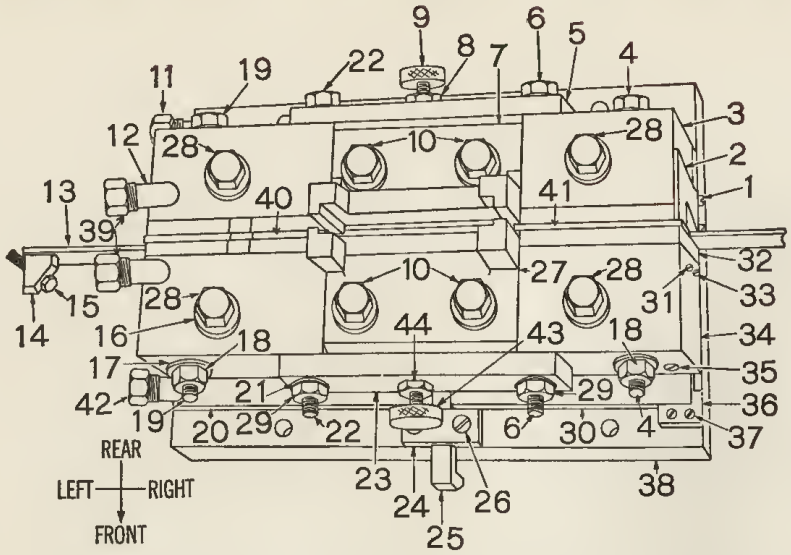


FIGURE 23
MOLD-HOLDER BASE PLATE Assembly with MOLD

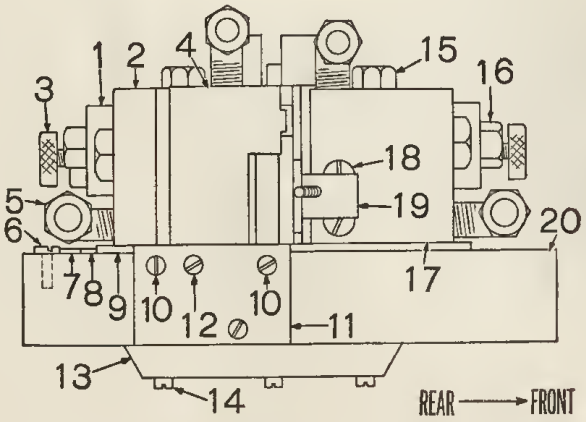


FIGURE 24
MOLD-HOLDER BASE PLATE Assembly with MOLD—Left End View

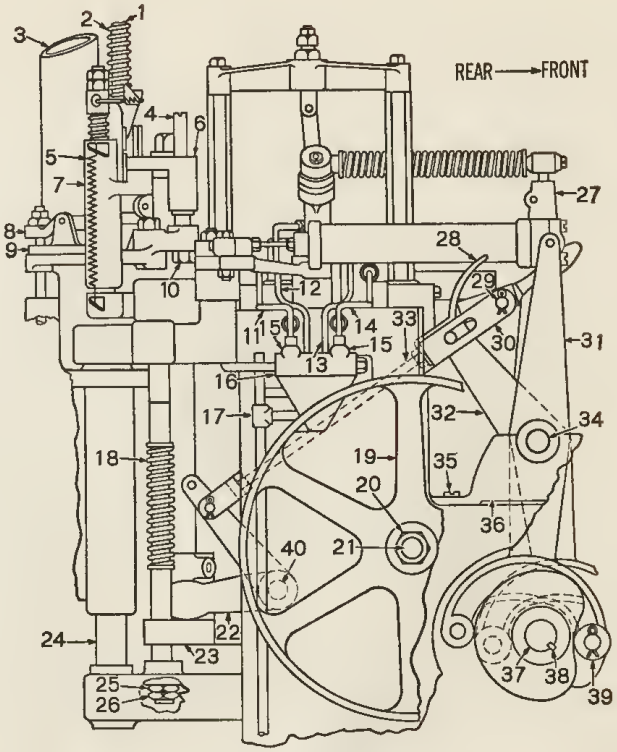


FIGURE 25
General Operating Mechanism—Left End View

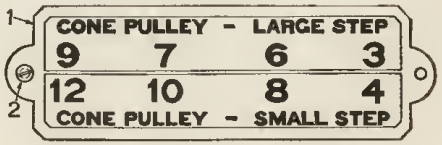


FIGURE 26
INDEX PLATE

Figure 27

Part No.	Symbol	Name
1	198E1	Base
2	199E2	Pulley Arm
3	b199E1E	Pulley
4	b199E3	Pulley Stud
5	.....	Motor
6	243E6	Bolt (4)
7	243E7	Washer (4)
8	a243E1	Base Block
9	243E5	Washer (4)
10	a243E3	Bolt (2)
11	199E4	Nut
12	a199E6	Bushing
13	27L1	Motor Pulley
14	27L3	Set Screw
15	243E4	Nut (4)

Figure 28

Part No.	Symbol	Name
..	b199E1E	Pulley (Idler)
..	b199E3	Stud
..	a199E6	Bushing
..	200E1	Spring
..	a200E2	Extension
..	277E1	Pulley (Intermediate)
..	277E2	Bracket
..	277E3	Bushing
..	277E4	Sprocket
..	277E6	Stud
..	278E1E	Pulley (Motor)
..	278E2	Sprocket
..	279E1	Chain
..	a69H2	Fulcrum Pin

Figure 29

Part No.	Symbol	Name
1	a25L1	Gage (Standard)
..	a25L2	Gage (Logotype)
..	.....	Fusion Matrix
..	.....	Non-fusion Matrix

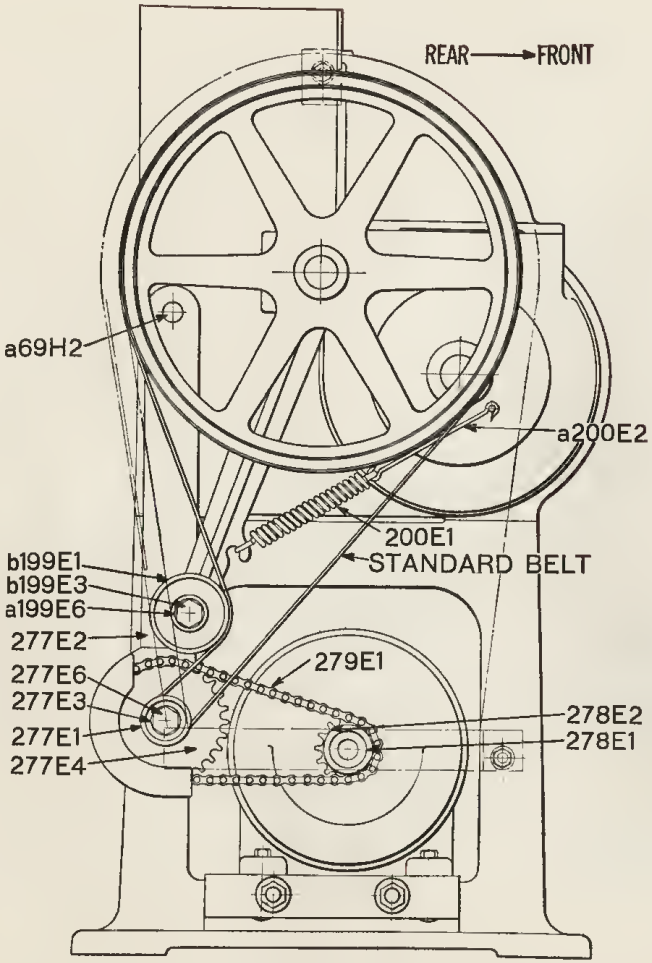


FIGURE 27
SPEED REDUCING DEVICE for 18-Point

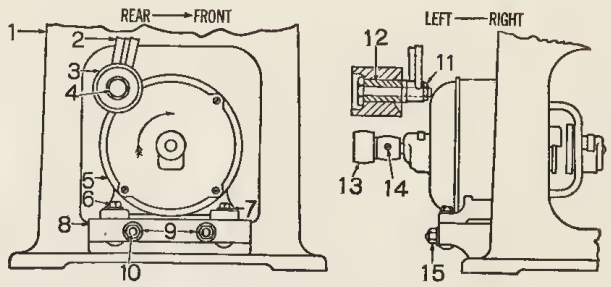


FIGURE 28
MOTOR and IDLER

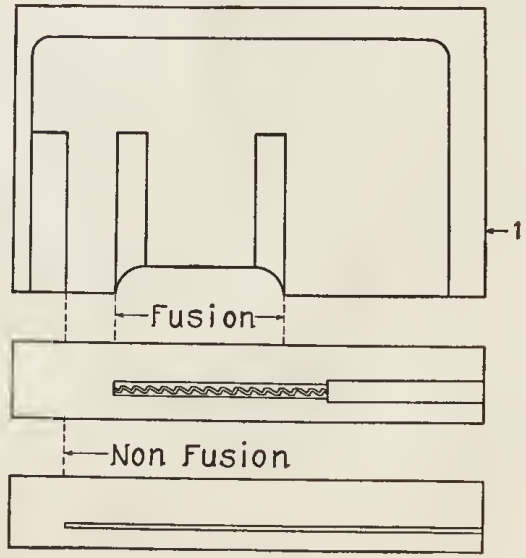


FIGURE 29
MOLD BLADE GAGE
Fusion MATRIX and Non-fusion MATRIX

Figure 30

Part No.	Symbol	Name
1	221F5	Ratchet Wheel Pawl
2	221F14	Pawl Fulcrum Pin
3	221F13	Abutment Screw
4	221F15	Pawl Spring
5	221F8	Plate Screws (2)
6	221F18	Cam Screws (3)

Figure 31

Part No.	Symbol	Name
1	156F2	Cutter Bracket Bolt
2	221F16	Spring Post
3	221F6	Ratchet Pawl Carrier
4	221F12	Carrier Abutment
5	221F1	Ratchet Wheel
6	221F17	Trip Cam
7	221F3	Frictidn Spring
8	221F4	Frictidn Spring Cdllar

Figure 32

Part No.	Symbol	Name
1	221F19	Trip Finger
2	b84F2F	Shear Blade Guide
3	93F1	Supporting Beam
4	93F2	Supporting Beam Bolt

Figure 33

Part No.	Symbol	Name
1	221F7	Retaining Plate
2	221F9	Ratchet Wheel Stand
3	221F10	Stand Kev (2)
4	221F11	Stand Kev Screw (2)
5	221F2	Ratchet Wheel Bushing

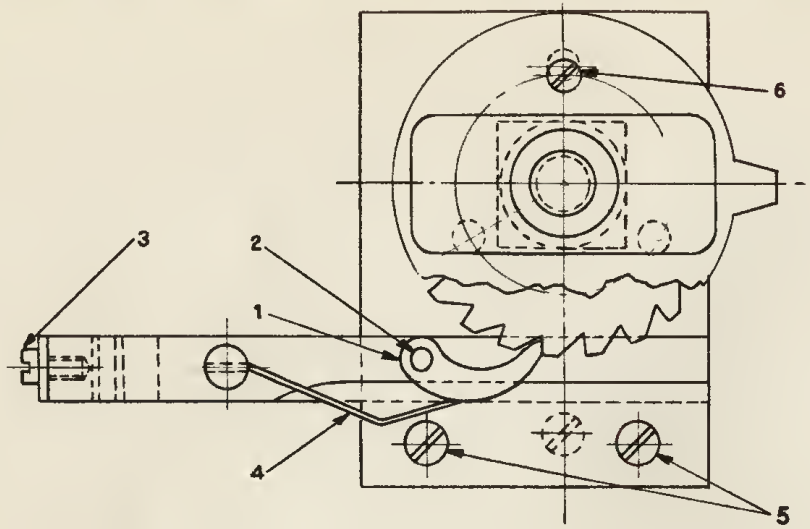


FIGURE 30

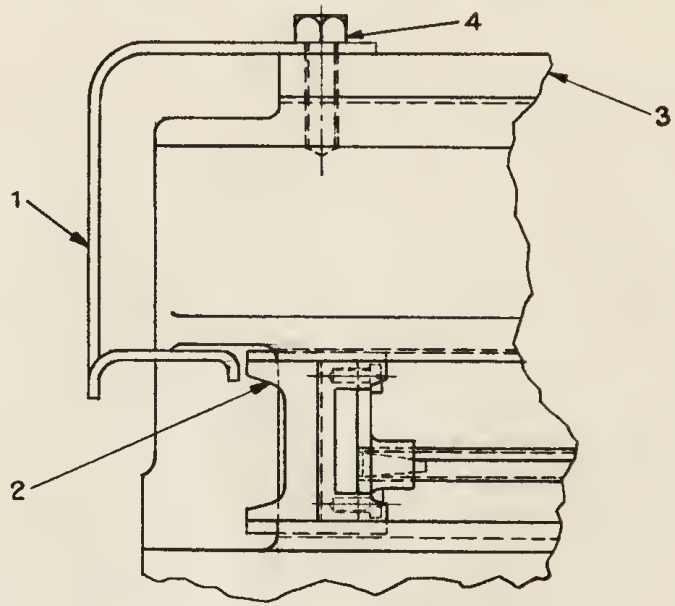


FIGURE 32

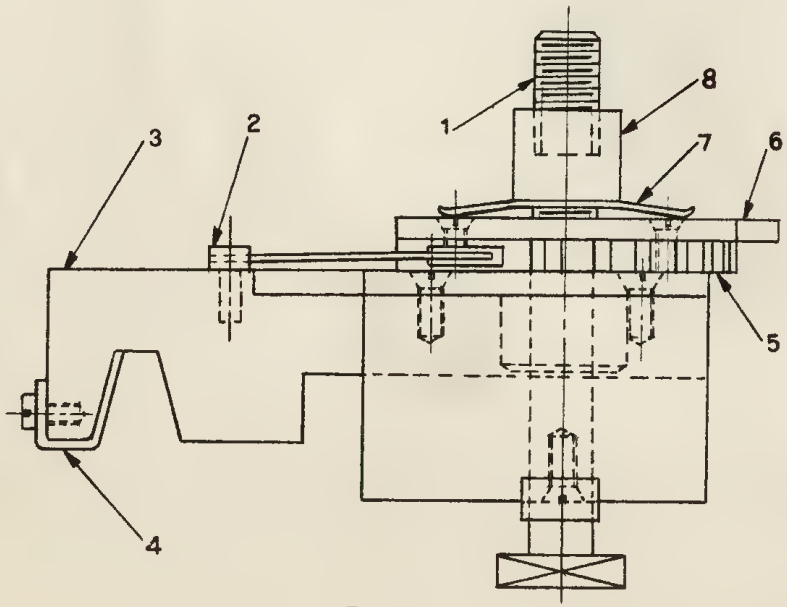


FIGURE 31

CUTTER TRIPPING DEVICE—For 1 Pt. Leads.

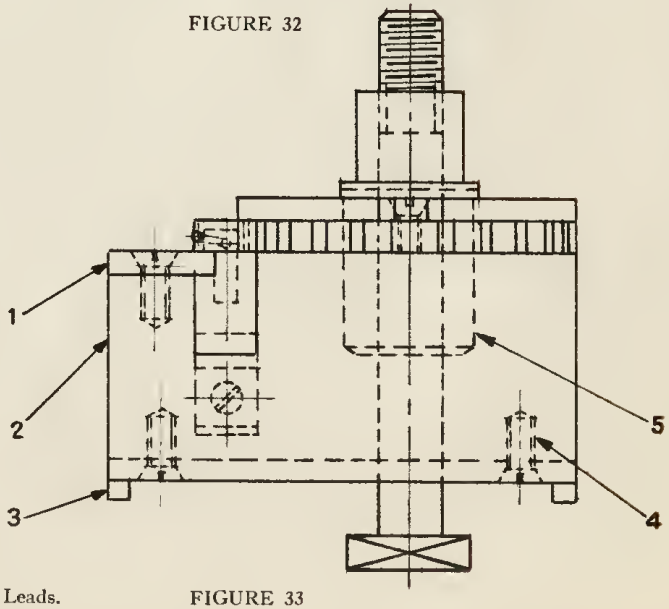
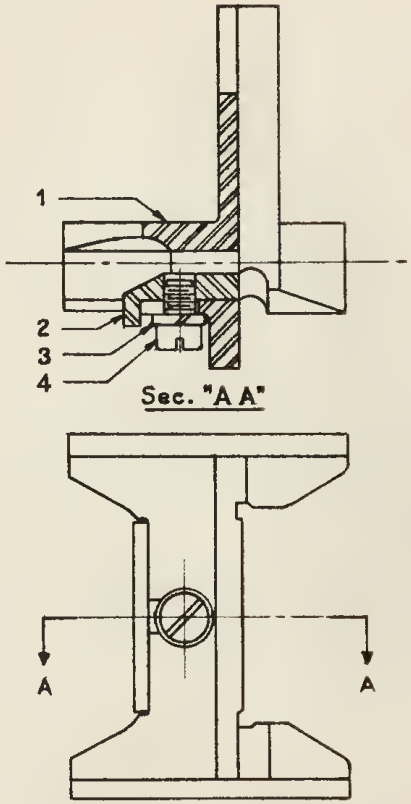


FIGURE 33

Figure 34

Part No.	Symbol	Name
1	b84F2	Shear Blade Guide
2	84F4	Reducing Attachment
3	493	Lock Washer
4	d2357	Screw



B84 F 2F
1 Pt. to 9 Pt., *9 Pt. to 18 Pt.
*Note: For Use in Casting Above
9 Pt. Size, Remove 2, 3 & 4.
FIGURE 34
Shear Blade Guide